

# MDS-JE780

## SERVICE MANUAL



Ver. 1.4 2006.12

AEP Model  
UK Model  
E Model



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|                                    |               |
|------------------------------------|---------------|
| Model Name Using Similar Mechanism | MDS-JE480     |
| MD Mechanism Type                  | MDM-7S1A      |
| Optical Pick-up Type               | KMS-260B/260E |

### SPECIFICATIONS

|                       |  |
|-----------------------|--|
| System                | MiniDisc digital audio system  |
| Disc                  | MiniDisc   |
| Laser                 | Semiconductor laser<br>( $\lambda = 780 \text{ nm}$ )<br>Emission duration: continuous<br>MAX 44.6 $\mu\text{W}^1$ )                       |
| Laser output          |  |
| 1)                    | This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up Block with 7 mm aperture. |
| Laser diode           | Material: GaAlAs   |
| Revolutions (CLV)     | 400 rpm to 900 rpm   |
| Error correction      | ACIRC (Advanced Cross Interleave Reed Solomon Code)  |
| Sampling frequency    | 44.1 kHz   |
| Coding                | ATRAC (Adaptive Transform Acoustic Coding)/ATRAC 3   |
| Modulation system     | EFM (Eight-to-Fourteen Modulation)   |
| Number of channels    | 2 stereo channels  |
| Frequency response    | 5 to 20,000 Hz $\pm 0.3 \text{ dB}$  |
| Signal-to-noise ratio | Over 98 dB during play   |
| Wow and flutter       | Below measurable limit   |

#### Inputs

|  |   |
|--|---|
| ANALOG IN                                | Jack type: phono<br>Impedance: 47 kilohms<br>Rated input: 500 mVrms<br>Minimum input: 125 mVrms |
| DIGITAL OPTICAL IN                       | Connector type: square optical<br>Impedance: 660 nm (optical wave length)                       |
| DIGITAL COAXIAL IN (European model only) | Jack type: phono<br>Impedance: 75 ohms<br>Rated input: 0.5 Vp-p, $\pm 20\%$                     |

#### Outputs

|                     |   |
|---------------------|---|
| PHONES              | Jack type: stereo phone<br>Rated output: 28 mW<br>Load impedance: 32 ohms                               |
| ANALOG OUT          | Jack type: phono<br>Rated output: 2 Vrms (at 50 kilohms)<br>Load impedance: over 10 kilohms             |
| DIGITAL OPTICAL OUT | Connector type: square optical<br>Rated output: -18 dBm<br>Load impedance: 660 nm (optical wave length) |

#### General

|                      |  |
|----------------------|--|
| Power requirements   |  |
| European model:      | 230 V AC, 50/60 Hz   |
| Other model:         | 110 – 120/220 – 240 V AC, 50/60 Hz<br>Adjustable with voltage selector |
| Power consumption    | 15 W (0.4 W in standby mode)   |
| Dimensions (approx.) | 430 x 95 x 285 mm (w/h/d) incl. projecting parts and controls          |
| Mass (approx.)       | 3.1 kg   |

#### Supplied accessories

|   |
|---|
| Audio connecting cords (2)                    |
| Optical cable (1)                             |
| OpenMG Jukebox CD-ROM (1)                     |
| Operating instructions for OpenMG Jukebox (1) |
| Remote commander (remote) (1)                 |
| R6 (size-AA) batteries (2)                    |
| USB cable (1)                                 |
| Instruction manual                            |

Design and specifications are subject to change without notice.

## MINIDISC DECK

9-874-014-05  
2006L02-1  
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**Sony Corporation**  
Home Audio Division  
Published by Sony Techno Create Corporation

# SONY®

CAUTION

Danger of explosion if battery is incorrectly replaced.  
Replace only with the same or equivalent type recommended by the manufacturer.  
Discard used batteries according to the manufacturer’s instructions.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.  
Udskiftning må kun ske med batteri  
af samme fabrikat og type.  
Levér det brugte batteri tilbage til leverandøren.

ADVARSEL

Ekspløsjonsfare ved feilaktig skifte av batteri.  
Benytt samme batteritype eller en tilsvarende type  
anbefalt av apparatfabrikanten.  
Brukte batterier kasseres i henhold til fabrikantens  
instruksjoner.

WARNING

Explosionsfara vid felaktigt batteribyte.  
Använd samma batterityp eller en likvärdig typ som  
rekommenderas av apparattillverkaren.  
Kassera använt batteri enligt gällande föreskrifter.

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.  
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.  
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

NOTES ON HANDLING THE OPTICAL PICK-UP  
BLOCK OR BASE UNIT

The laser diode in the optical pick-up block may suffer electrostatic break-down because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.  
During repair, pay attention to electrostatic break-down and also use the procedure in the printed matter which is included in the repair parts.  
The flexible board is easily damaged and should be handled with care.

NOTES ON LASER DIODE EMISSION CHECK

Never look into the laser diode emission from right above when checking it for adjustment. It is feared that you will lose your sight.

Laser component in this product is capable  
of emitting radiation exceeding the limit for  
Class 1.

CLASS 1 LASER PRODUCT  
LUOKAN 1 LASERLAITE  
KLASS 1 LASERAPPARAT

This appliance is classified as a  
CLASS 1 LASER product. The  
CLASS 1 LASER PRODUCT  
MARKING is located on the  
rear exterior.

CAUTION : INVISIBLE LASER RADIATION WHEN OPEN AND  
INTERLOCKS DEFEATED, AVOID EXPOSURE TO BEAM.  
ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING NÅR  
Sikkerhedsafbrydere er ude af funktion, undgå udsættelse  
for stråling.  
VORSICHT : UNSICHTBARE LASERSTRAHLUNG, WENN  
ABDECKUNG GEÖFFNET UND SICHERHEITSVERRIEGELUNG  
ÜBERBRÜCKT, NICHT DEM STRAHL AUSSETZEN.  
VARO! : AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALT-  
TIINA NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.  
VARNING : OSYNLIG LASERSTRÅLING NÅR DESSA ÖPPNAD  
OCH SPÄRREN ÄR URKOPPLAD, BETRÄKTA EJ STRÅLEN.  
ADVERSEL : USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG  
Sikkerhedslås brytes, unngå eksponering for strålen.  
VIGYAZAT! : A BUKOLAT NYITÁSÁKOR LÁTHATATLAN LÉZERSU-  
GÁRVESZÉLY! KERÜLJE A BESUGÁRZÁST!

This caution  
label is located  
inside the unit.

CAUTION

Use of controls or adjustments or performance of procedures  
other than those specified herein may result in hazardous radia-  
tion exposure.



Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

Flexible Circuit Board Repairing

- Keep the temperature of soldering iron around 270°C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  OR DOTTED LINE WITH  
MARK  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS  
LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE  
COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS  
APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS  
PUBLISHED BY SONY.

## SELF-DIAGNOSIS FUNCTION

The self-diagnosis function consists of error codes for customers which are displayed automatically when errors occur, and error codes which show the error history in the test mode during servicing. For details on how to view error codes for the customer, refer to the following box in the instruction manual. For details on how to check error codes during servicing, refer to the following “Procedure for using the Self-Diagnosis Function (Error History Display Mode)”.

### Self-diagnosis function

The deck's self-diagnosis function automatically checks the condition of the MD deck when an error occurs, then issues a three- or five-digit code and an error message on the display. If the code and message alternate, find them in the following table and perform the indicated countermeasure. Should the problem persist, consult your nearest Sony dealer.

| Three- or five-digit code/<br>Message | Cause/Remedy  |
|---------------------------------------|---|
| C11/Protected                         | The inserted MD is record-protected.<br>➔ Take out the MD and close the record-protect slot.  |
| C12/Cannot Copy                       | You tried to record a CD with a format that the external device connected to the deck does not support, such as CD-ROM or video CD.<br>➔ Remove the disc and insert a music CD. |
| C13/REC Error                         | The recording was not made properly.<br>➔ Set the deck in a stable surface, and repeat the recording procedure.   |
|                                       | The inserted MD is dirty (with smudges, fingerprints, etc.), scratched, or substandard in quality.<br>➔ Replace the disc and repeat the recording procedure.                    |
| C13/Read Error                        | The deck could not read the TOC on the MD properly.<br>➔ Take out the MD and insert it again.   |

| Three- or five-digit code/<br>Message | Cause/Remedy   |
|---------------------------------------|--|
| C14/Toc Error                         | The deck could not read the TOC on the MD properly.<br>➔ Insert another disc.<br>➔ If possible, erase all the tracks on the MD.  |
| C41/Cannot Copy                       | The sound source is a copy of commercially available music software, or you tried to record a CD-R (Recordable CD).<br>➔ The Serial Copy Management System prevents making a digital copy. You cannot record a CD-R.                 |
| C71/Din Unlock                        | The sporadic appearance of this message is caused by the digital signal being recorded. This will not affect the recording.  |
|                                       | While recording from a digital component, the digital connecting cable may have been incompletely connected and come loose or the digital component was turned off.<br>➔ Check the connection or turn the digital component back on. |
| E0001/<br>MEMORY NG                   | There is an error in the internal data that the deck needs in order to operate.<br>➔ Consult your nearest Sony dealer.   |
| E0101/<br>LASER NG                    | There is a problem with the optical pickup.<br>➔ The optical pick-up may have failed. Consult your nearest Sony dealer.  |
| E0201/<br>LOADING NG                  | There is a problem with the loading.<br>➔ The loading may have failed. Consult your nearest Sony dealer.   |







### Procedure for using the Self-Diagnosis Function (Error History Display Mode).

**Note:** Perform the self-diagnosis function in the “error history display mode” in the test mode. The following describes the least required procedure. Be careful not to enter other modes by mistake. If you set other modes accidentally, press the **MENU/NO** button to exit the mode.

- While pressing the **◀◀AMS▶▶** knob and **■** button, connect the power plug to the outlet, and release the **◀◀AMS▶▶** knob and **■** button.  
When the test mode is set, “[Check]” will be displayed.
- Rotate the **◀◀AMS▶▶** knob and when “[Service]” is displayed, press the **YES** button.
- Rotate the **◀◀AMS▶▶** knob and display “Err Display”.
- Pressing the **YES** button sets the error history mode and displays “op rec tm”.
- Select the contents to be displayed or executed using the **◀◀AMS▶▶** knob.
- Pressing the **◀◀AMS▶▶** knob will display or execute the contents selected.
- Pressing the **◀◀AMS▶▶** knob another time returns to step 4.
- Pressing the **MENU/NO** button displays “Err Display” and exits the error history mode.
- To exit the test mode, press the **REPEAT** button. The unit sets into the STANDBY state, the disc is ejected, and the test mode ends.

## ITEMS OF ERROR HISTORY MODE ITEMS AND CONTENTS

### Selecting the Test Mode

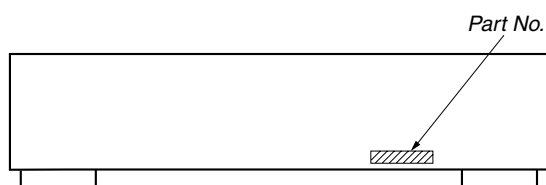
| Display     | History   |
|-------------|---|
| op rec tm   | Displays the total recording time.<br>When the total recording time is more than 1 minute, displays the hour and minute<br>When less than 1 minute, displays "Under 1 min"<br>The display time is the time the laser is set to high power, which is about 1/4 of the actual recording time.   |
| op play tm  | Displays the total playback time.<br>When the total playback time is more than 1 minute, displays the hour and minute<br>When less than 1 minute, displays "Under 1 min"  |
| spdl rp tm  | Displays the total rotating time of the spindle motor.<br>When the total rotating time is more than 1 minute, displays the hour and minute<br>When less than 1 minute, displays "Under 1 min"   |
| retry err   | Displays the total number of retry errors during recording and playback<br>Displays "r xx p yy". xx is the number of errors during recording. yy is the number of errors during playback.<br>This is displayed in hexadecimal from 00 to FF.  |
| total err   | Displays the total number of errors<br>Displays "total xx". This is displayed in hexadecimal from 00 to FF.   |
| err history | Displays the past ten errors.<br>Displays "0x ErrCd@@".<br>X is the history number. The younger the number, the more recent is the history (00 is the latest). @@ is the error code.<br>Select the error history number using the  knob.   |
| retry adrs  | Displays the past five retry addresses.<br>Displays "xx ADRS yyyy", xx is the history number, yyyy is the cluster with the retry error.<br>Select the error history number using the  knob.  |
| er refresh  | Mode for erasing the error and retry address histories<br>Procedure<br>1. Press the  knob when displayed as "er refresh".<br>2. Press the <b>YES</b> button when the display changes to "er refresh?".<br>When "complete!" is displayed, it means erasure has completed.<br>Be sure to check the following after executing this mode.<br>*Data has been erased.<br>*Perform recording and playback, and check that the mechanism is normal.      |
| tm change   | Mode for erasing the total time of recording and playback<br>Procedure<br>1. Press the  knob when displayed as "tm refresh".<br>2. Press the <b>YES</b> button when the display changes to "tm refresh?".<br>When "complete!" is displayed, it means erasure has completed.  |
| op change   | Mode for erasing the total time of op rec tm, op play tm.<br>These histories are based on the time of replacement of the optical pickup. If the optical pick-up has been replaced, perform this procedure and erase the history.<br>Procedure<br>1. Press the  knob when displayed as "op change".<br>2. Press the <b>YES</b> button when the display changes to "op change?".<br>When "Complete!" is displayed, it means erasure has completed. |
| spdl change | Mode for erasing the total spdl rp tm time<br>These histories are based on the time of replacement of the spindle motor. If the spindle motor has been replaced, perform this procedure and erase the history.<br>Procedure<br>1. Press the  knob when displayed as "spdl change".<br>2. Press the <b>YES</b> button when the display changes to "spdl change?".<br>When "Complete!" is displayed, it means erasure has completed.               |

**Table of Error Codes**

| Error Code | Description   |
|------------|---|
| 10         | Could not load  |
| 12         | Loading switches combined incorrectly                     |
| 20         | Timed out without reading the top of PTOC                 |
| 21         | Could read top of PTOC, but detected error                |
| 22         | Timed out without accessing UTOC                          |
| 23         | Timed out without reading UTOC                            |
| 24         | Error in UTOC   |
| 30         | Could not start playback                                  |
| 31         | Error in sector   |
| 40         | Retry cause generated during normal recording             |
| 41         | Retried in DRAM overflow                                  |
| 42         | Retry occurred during TOC writing                         |
| 43         | Retry aborted during S.F editing                          |
| 50         | Other than access processing, and could not read address. |
| 51         | Focus NG occurred and overran.                            |

# **MODEL IDENTIFICATION**

— BACK PANEL —



| MODEL             | PARTS No.    |
|-------------------|--------------|
| AEP and RU models | 4-238-939-1□ |
| UK model          | 4-238-939-2□ |
| SP model          | 4-238-939-5□ |

- Abbreviation  
SP : Singapore model  
RU : Russian model

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## SECTION 1 SERVICING NOTES

### JIG FOR CHECKING BD BOARD WAVEFORM

The special jig (J-2501-196-A) is useful for checking the waveform of the BD board. The names of terminals and the checking items to be performed are shown as follows.

GND : Ground

I+3V : For measuring Iop (Check the deterioration of the optical pick-up laser)

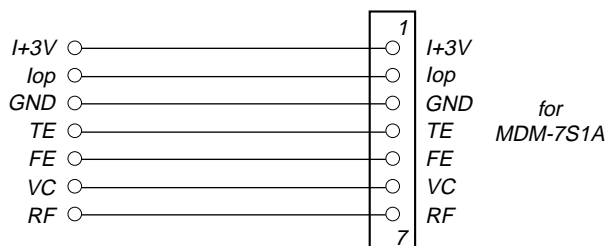
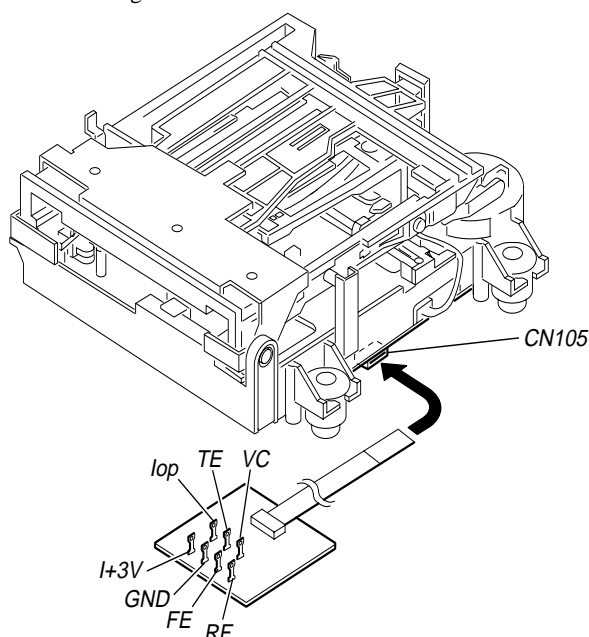
Iop : For measuring Iop (Check the deterioration of the optical pick-up laser)

TE : TRK error signal (Traverse adjustment)

VC : Reference level for checking the signal

RF : RF signal (Check jitter)

FE : Focus error signal



### Iop DATA RECORDING AND DISPLAY WHEN OPTICAL PICK-UP IS REPLACED

The Iop value labeled on the optical pick-up can be recorded in the non-volatile memory. By recording the value, it will eliminate the need to look at the value on the label of the optical pick-up. When replacing the optical pick-up, record the Iop value on the optical pick-up according to the following procedure.

#### Record Procedure:

1. While pressing the **AMS** knob and **REPEAT** button, connect the power plug to the outlet, and release the **AMS** knob and **REPEAT** button.
2. Rotate the **AMS** knob to display "[Service]", and press the **YES** button.
3. Rotate the **AMS** knob to display "Top Write" (C05), and press the **YES** button.
4. The display becomes "Ref=@ @ .@" (@ is an arbitrary number) and the numbers which can be changed will blink.
5. Input the Iop value written on the optical pick-up.  
To select the number : Rotate the **AMS** knob.  
To select the digit : Press the **AMS** knob.
6. When the **YES** button is pressed, the display becomes "Measu=@ @ @ .@" (@ is an arbitrary number).
7. As the adjustment results are recorded for the 6 value. Leave it as it is and press the **YES** button.
8. "Complete!" will be displayed momentarily. The value will be recorded in the non-volatile memory and the display will become "Top Write".
9. Press the **REPEAT** button to complete.

#### Display Procedure:

1. While pressing the **AMS** knob and **REPEAT** button, connect the power plug to the outlet, and release the **AMS** knob and **REPEAT** button.
2. Rotate the **AMS** knob to display "[Service]", and press the **YES** button.
3. Rotate the **AMS** knob to display "Top Read" (C26).
4. "@ @ .@ / ## ." is displayed and the recorded contents are displayed.  
@ @ .@ : indicates the Iop value labeled on the optical pick-up.  
## .# : indicates the Iop value after adjustment
5. To end, press the **AMS** button or **MENU/NO** button to display "Top Read". Then press the **REPEAT** button.

OPTICAL PICK-UP BLOCK TYPE DISCRIMINATION

There are two types of the optical pick-up block in this model.  
These are compatible except for the laser power.  
Check the type of the optical pick-up block before replacement.  
Adjust following items after replacing the optical pick-up block.

- 5-6-2. Laser Power Check (See page 26)
- 5-10. LASER POWER ADJUSTMENT (See page 29)

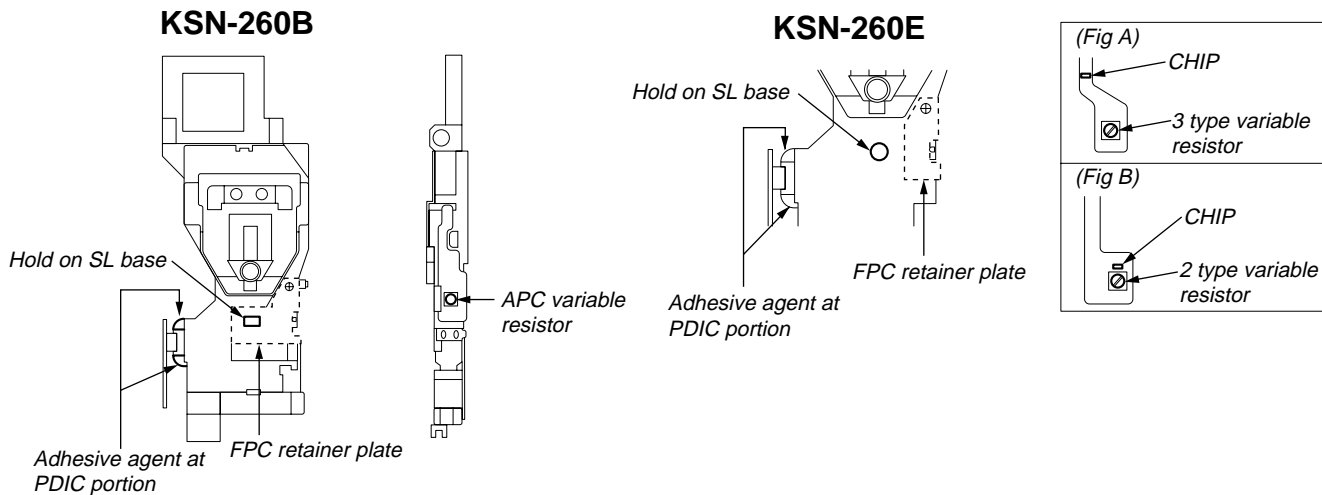
Differences

|   | KMS-260B                  | KMS-260E  |
|---|---------------------------|---|
| Color of the adhesive agent at PDIC portion | Pink                      | White   |
| Form of FPC retainer plate                  | Close the hole on SL base | Not close the hole on SL base                               |
| APC variable resistor                       | Small volume (2 type)     | Big variable resistor (3 type) and chip resistor (Fig. A)   |
|   |                           | Small variable resistor (2 type) and chip resistor (Fig. B) |

Fig. B type is for repair.

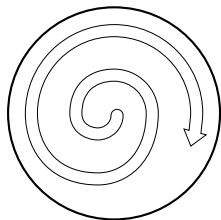
- Abbreviation

260B: KMS-260B model  
260E: KMS-260E model



• CLEANING THE OPTICAL PICK-UP

- Note 1:** In cleaning the lens, do not apply an excessive force  
As the optical pick-up is vulnerable, application of excessive force could damage the lens holder.
- Note 2:** In cleaning, do not use a cleaner other than exclusive cleaning liquid. (KK-91 or isopropyl alcohol)
- Note 3:** Wipe the objective lens spirally from center toward outside. (See Figure A)
- Note 4:** Eject the disc, if loaded.
- Note 5:** Disconnect the power cord from the socket to shut off the power supply.



(Figure A)

CHECKS PRIOR TO PARTS REPLACEMENT AND ADJUSTMENTS

Before performing repairs, perform the following checks to determine the faulty locations up to a certain extent. Details of the procedures are described in “5 Electrical Adjustments”.

- 5-6-2. Laser power check (see page 26)
- 5-6-3. Iop Compare (see page 26)
- 5-6-4. Auto Check (see page 27)

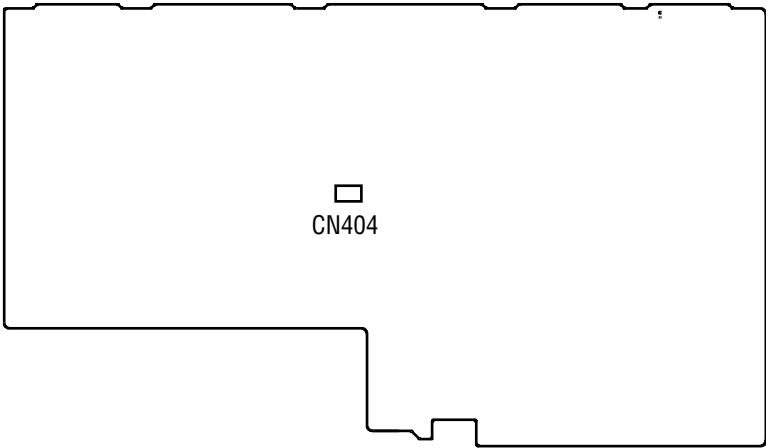
**Note:**  
The criteria for determination above is intended merely to determine if satisfactory or not, and does not serve as the specified value for adjustments.  
When performing adjustments, use the specified values for adjustments.

FORCED RESET

The system microprocessor can be reset in the following procedure.  
Use these procedure when the unit cannot be operated normally due to the overrunning of the microprocessor, etc.

**Procedure :**  
Remove the short-pin attached to CN404, and then attach it again.

[MAIN BOARD] (Component Side)



NOTES ON REPLACING BD BOARD OR MD MECHANISM DECK

In replacing the BD board or MD mechanism deck, perform the work through the steps provided below:

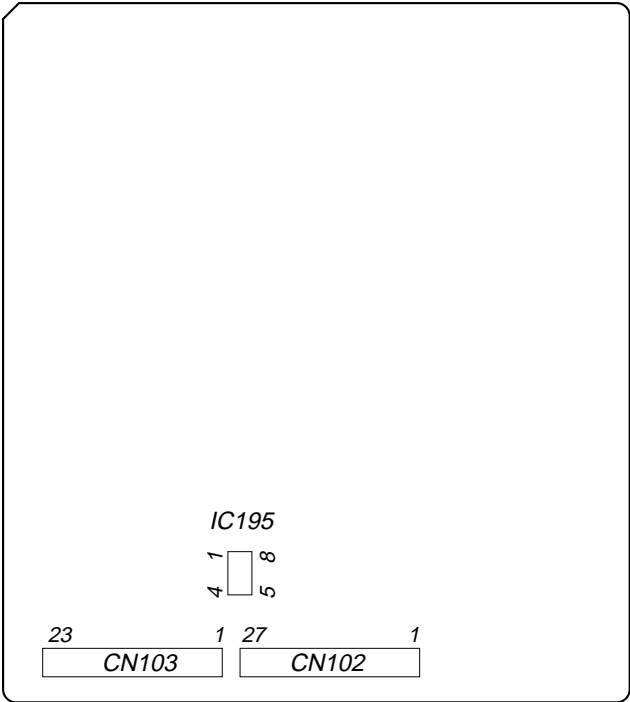
1. Remove the IC195 from the BD board to be replaced.
2. Remove the IC195 from new BD board.
3. Mount the IC195 on new BD board, which was removed from the BD board to be replaced.
4. Install new BD board in the set.

**Note:** The IC195 cannot be replaced with a new part.

OPERATION CHECK IN NORMAL MODE

Aiso in checking the recording and other functions, connect the set to the PC with a USB cable and perform the operation on the application software “OpenMG Jukebox” attached.

– BD BOARD (Conductor Side) –





## RETRY CAUSE DISPLAY MODE

- In this test mode, the causes for retry of the unit during recording can be displayed on the fluorescent indicator tube. During playback, the “track mode” for obtaining track information will be set. This is useful for locating the faulty part of the unit.
- The following will be displayed :  
During recording and stop : Retry cause, number of retries, and number of retry errors.  
During playback : Information such as type of disc played, part played, copyright.  
These are displayed in hexadecimal.

### Procedure:

1. Insert the recordable disc.
2. Press **MENU/NO** button to display “Edit Menu” on the fluorescent display.
3. Turn **◀◀ AMS ▶▶** knob to display “All Erase?” on the fluorescent display.
4. Press **YES** button or **◀◀ AMS ▶▶** knob to display “All Erase??” on the fluorescent display.
5. Press **YES** button, “Complete!” is displayed on the fluorescent display and it turns off immediately.
6. Procedure 1: Press the **■** button continuously for about 10 seconds.  
Procedure 2: Press the **LEVEL/DISPLAY/CHAR** button while pressing the **■** button and **MENU/NO** button.
7. When the mode is set, “RTs 00c 00e 000” is displayed.
8. Press the **● REC** button to start recording. Then press the **||** button and start recording.
9. To check the “track mode”, press the **▷** button to start play.
10. To exit the test mode, press the **I/O** button, and turn OFF the power. When “TOC” disappears, disconnect the power plug from the outlet.  
If the test mode cannot be exited, refer to “Forced Reset” on page 8.

**Fig. 1 Reading the Test Mode Display  
(During recording and stop)**

RTs@ @c##e\*\*\*

Fluorescent display tube display

@@ : Cause of retry  
## : Number of retries  
\*\*\* : Number of retry errors

**Fig. 2 Reading the Test Mode Display  
(During playback)**

@ @####\*\$

Fluorescent display tube display

@@ : Parts No. (name of area named on TOC)  
### : Cluster } Address (Physical address on disc)  
\*\* : Sector  
\$\$ : Track mode (Track information such as copyright information of each part)

### Reading the Retry Cause Display

|             | Higher Bits |    |    |    | Lower Bits |    |    |    | Hexa-decimal | Cause of Retry        | Occurring conditions                                    |
|-------------|-------------|----|----|----|------------|----|----|----|--------------|-----------------------|---|
| Hexadecimal | 8           | 4  | 2  | 1  | 8          | 4  | 2  | 1  |              |                       |   |
| Bit         | b7          | b6 | b5 | b4 | b3         | b2 | b1 | b0 |              |                       |   |
| Binary      | 0           | 0  | 0  | 0  | 0          | 0  | 0  | 1  | 01           | shock                 | When track jump (shock) is detected                     |
|             | 0           | 0  | 0  | 0  | 0          | 0  | 1  | 0  | 02           | ader5                 | When ADER was counted more than five times continuously |
|             | 0           | 0  | 0  | 0  | 0          | 1  | 0  | 0  | 04           | Discontinuous address | When ADIP address is not continuous                     |
|             | 0           | 0  | 0  | 0  | 1          | 0  | 0  | 0  | 08           | DIN unlock            | When DIN unlock is detected                             |
|             | 0           | 0  | 0  | 1  | 0          | 0  | 0  | 0  | 10           | FCS incorrect         | When not in focus                                       |
|             | 0           | 0  | 1  | 0  | 0          | 0  | 0  | 0  | 20           | IVR rec error         | When ABCD signal level exceeds the specified range      |
|             | 0           | 1  | 0  | 0  | 0          | 0  | 0  | 0  | 40           | CLV unlock            | When CLV is unlocked                                    |
|             | 1           | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 80           | Access fault          | When access operation is not performed normally         |

### Reading the Display:

Convert the hexadecimal display into binary display.  
If more than two causes, they will be added.

### Example

When 42 is displayed:  
Higher bit : 4 = 0100 → b6  
Lower bit : 2 = 0010 → b1  
In this case, the retry cause is combined of “CLV unlock” and “ader5”.

When A2 is displayed:  
Higher bit : A = 1010 → b7+b5  
Lower bit : 2 = 0010 → b2  
The retry cause in this case is combined of “access fault”, “IVR rec error”, and “ader5”.

**Hexadecimal → Binary Conversion Table**

| Hexadecimal | Binary | Hexadecimal | Binary |
|-------------|--------|-------------|--------|
| 0           | 0000   | 8           | 1000   |
| 1           | 0001   | 9           | 1001   |
| 2           | 0010   | A           | 1010   |
| 3           | 0011   | B           | 1011   |
| 4           | 0100   | C           | 1100   |
| 5           | 0101   | D           | 1101   |
| 6           | 0110   | E           | 1110   |
| 7           | 0111   | F           | 1111   |

## Reading the Track Mode Display

|             | Higher Bits |    |    |    | Lower Bits |    |    |    | Hexa-<br>decimal | Details  |               |
|-------------|-------------|----|----|----|------------|----|----|----|------------------|--|---------------|
| Hexadecimal | 8           | 4  | 2  | 1  | 8          | 4  | 2  | 1  |                  |  |               |
| Bit         | b7          | b6 | b5 | b4 | b3         | b2 | b1 | b0 |                  | When 0   | When 1        |
| Binary      | 0           | 0  | 0  | 0  | 0          | 0  | 0  | 1  | 01               | Emphasis OFF   | Emphasis ON   |
|             | 0           | 0  | 0  | 0  | 0          | 0  | 1  | 0  | 02               | Monaural   | Stereo        |
|             | 0           | 0  | 0  | 0  | 0          | 1  | 0  | 0  | 04               | This is 2-bit display. Normally 01.<br>01:Normal audio. Others:Invalid |               |
|             | 0           | 0  | 0  | 0  | 1          | 0  | 0  | 0  | 08               |  |               |
|             | 0           | 0  | 0  | 1  | 0          | 0  | 0  | 0  | 10               | Audio (Normal)   | Invalid       |
|             | 0           | 0  | 1  | 0  | 0          | 0  | 0  | 0  | 20               | Original   | Digital copy  |
|             | 0           | 1  | 0  | 0  | 0          | 0  | 0  | 0  | 40               | Copyright  | No copyright  |
|             | 1           | 0  | 0  | 0  | 0          | 0  | 0  | 0  | 80               | Write prohibited   | Write allowed |

### Reading the Display:

Convert the hexadecimal display into binary display. If more than two causes, they will be added.

Example When 84 is displayed:

Higher bit : 8 = 1000 → b7

Lower bit : 4 = 0100 → b2

In this case, as b2 and b7 are 1 and others are 0, it can be determined that the retry cause is combined of “emphasis OFF”, “monaural”, “original”, “copyright exists”, and “write allowed”.

Example When 07 is displayed:

Higher bit : 0 = 1000 → All 0

Lower bit : 7 = 0111 → b0+b1+b2

In this case, as b0, b1, and b2 are 1 and others are 0, it can be determined that the retry cause is combined of “emphasis ON”, “stereo”, “original”, “copyright exists”, and “write prohibited”.

### Hexadecimal → Binary Conversion Table

| Hexadecimal | Binary | Hexadecimal | Binary |
|-------------|--------|-------------|--------|
| 0           | 0000   | 8           | 1000   |
| 1           | 0001   | 9           | 1001   |
| 2           | 0010   | A           | 1010   |
| 3           | 0011   | B           | 1011   |
| 4           | 0100   | C           | 1100   |
| 5           | 0101   | D           | 1101   |
| 6           | 0110   | E           | 1110   |
| 7           | 0111   | F           | 1111   |

## SECTION 2 GENERAL

This section is extracted from instruction manual.

### Main unit

#### ALPHABETICAL ORDER

##### A - M

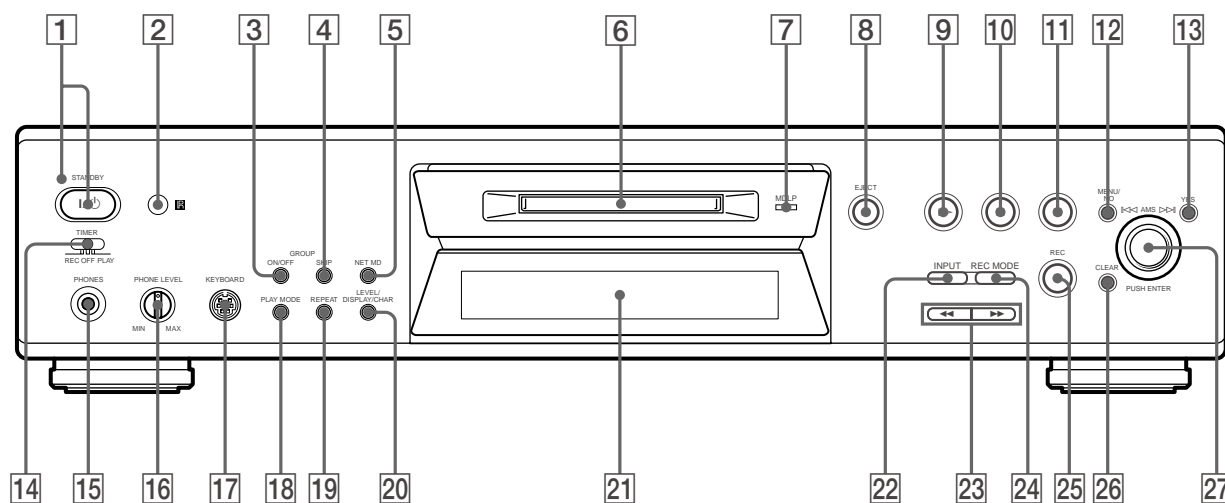
AMS **27** (14) (21) (27) (39) (43)  
 CLEAR **26** (24) (33) (43)  
 Display window **21**  
 EJECT **8** (10) (21) (26)  
 GROUP ON/OFF **3** (11) (23) (34)  
 GROUP SKIP **4** (12) (23) (34)  
 INPUT **22** (10)  
 KEYBOARD jack **17** (43)  
 LEVEL/DISPLAY/CHAR **20** (10) (16) (21) (32)  
 MD insertion slot **6** (10) (20)  
 MDLP indicator **7** (14) (21)  
 MENU/NO **12** (14) (21) (26) (39) (43)

##### N - Y

NET MD **5** (9)  
 PHONE LEVEL **16** (21)  
 PHONES jack **15** (17) (21) (40)  
 PLAY MODE **18** (20) (42)  
 REC MODE **24** (13)  
 REC **25** (10) (14) (17)  
 Remote sensor **2** (8)  
 REPEAT **19** (20)  
 STANDBY indicator **1** (10) (20)  
 TIMER **14** (42)  
 YES **13** (14) (25) (27) (39) (43)

#### BUTTON DESCRIPTIONS

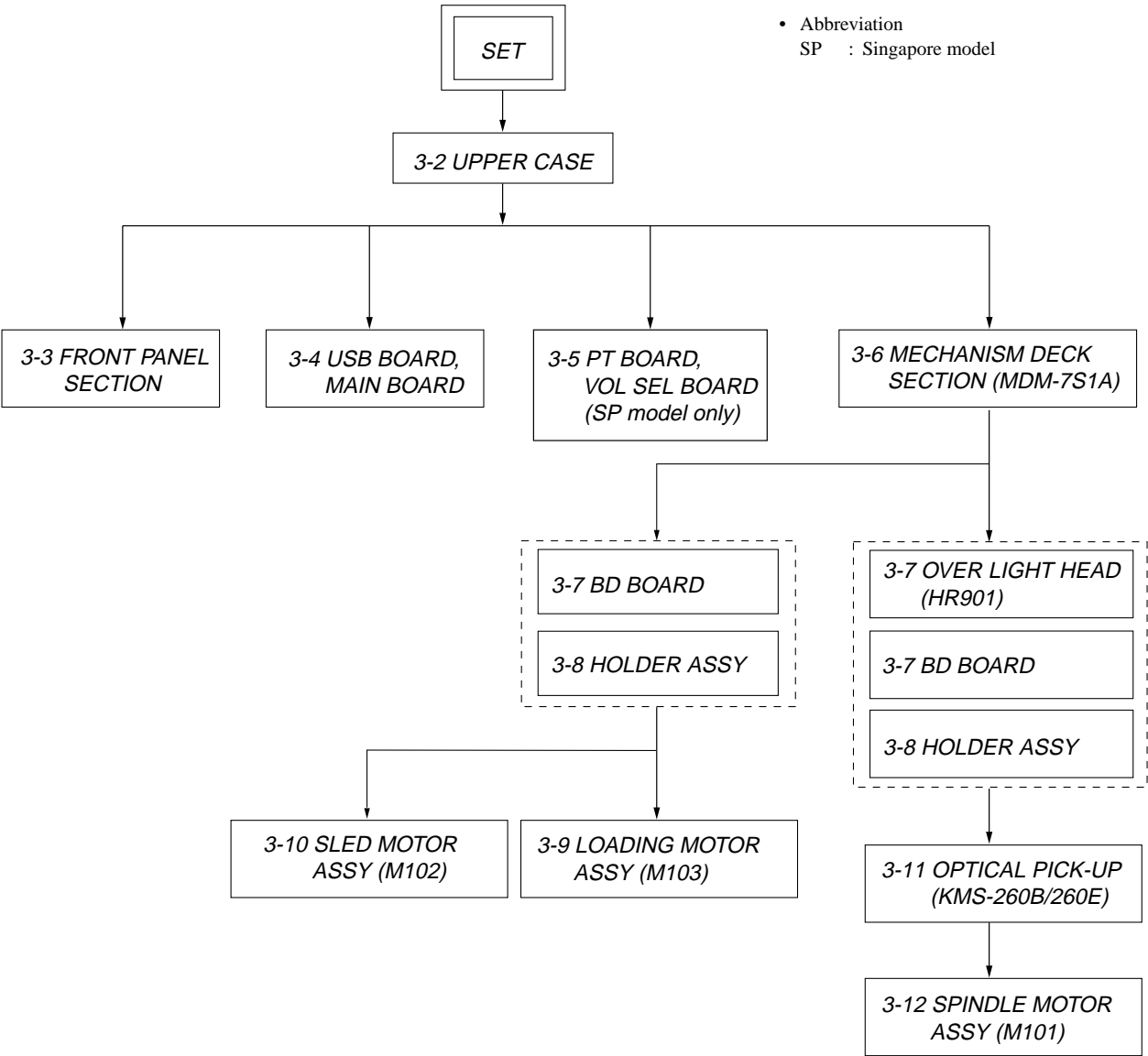
I/⏻ **1** (10) (20) (26)  
 ▷ **9** (10) (20) (42) (44)  
 || **10** (10) (21) (44)  
 ■ **11** (10) (21) (26) (42) (44)  
 ◀◀/▶▶ **23** (21) (28) (44)



SECTION 3  
DISASSEMBLY

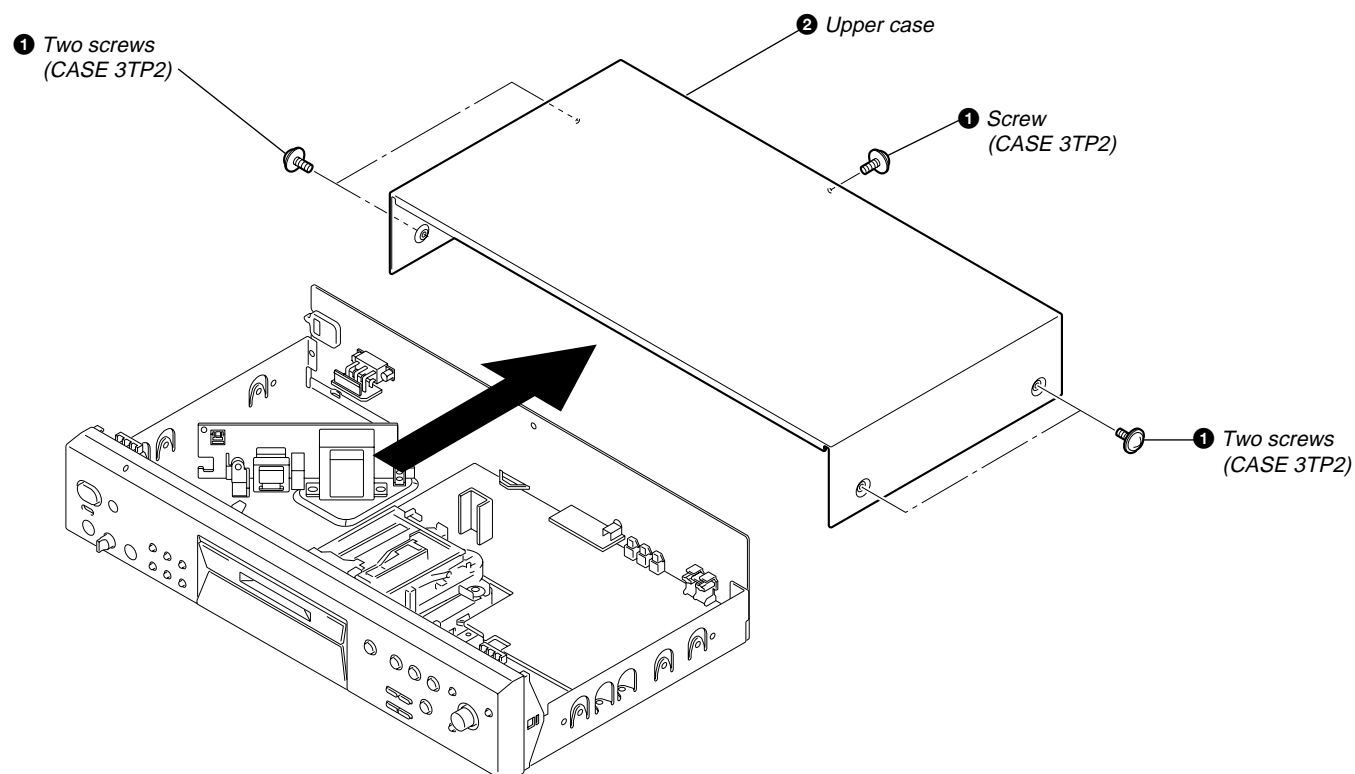
• This set can be disassembled in the order shown below.

3-1. DISASSEMBLY FLOW

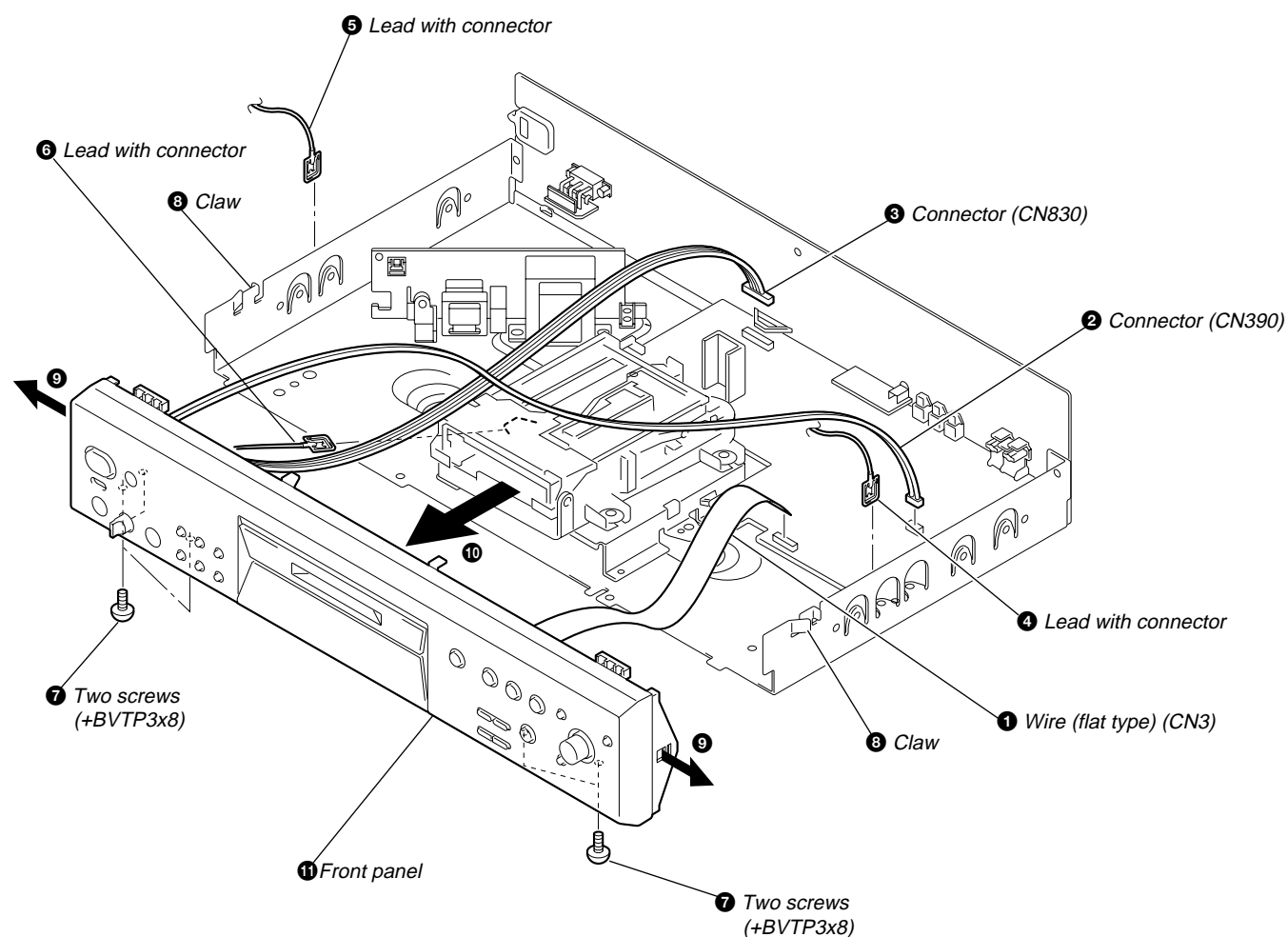


**Note 1:** The processes enclosed with [ - - - ], remove in the any order.  
**Note 2:** You cannot go to the next process until every process enclosed with [ - - - ] has done.

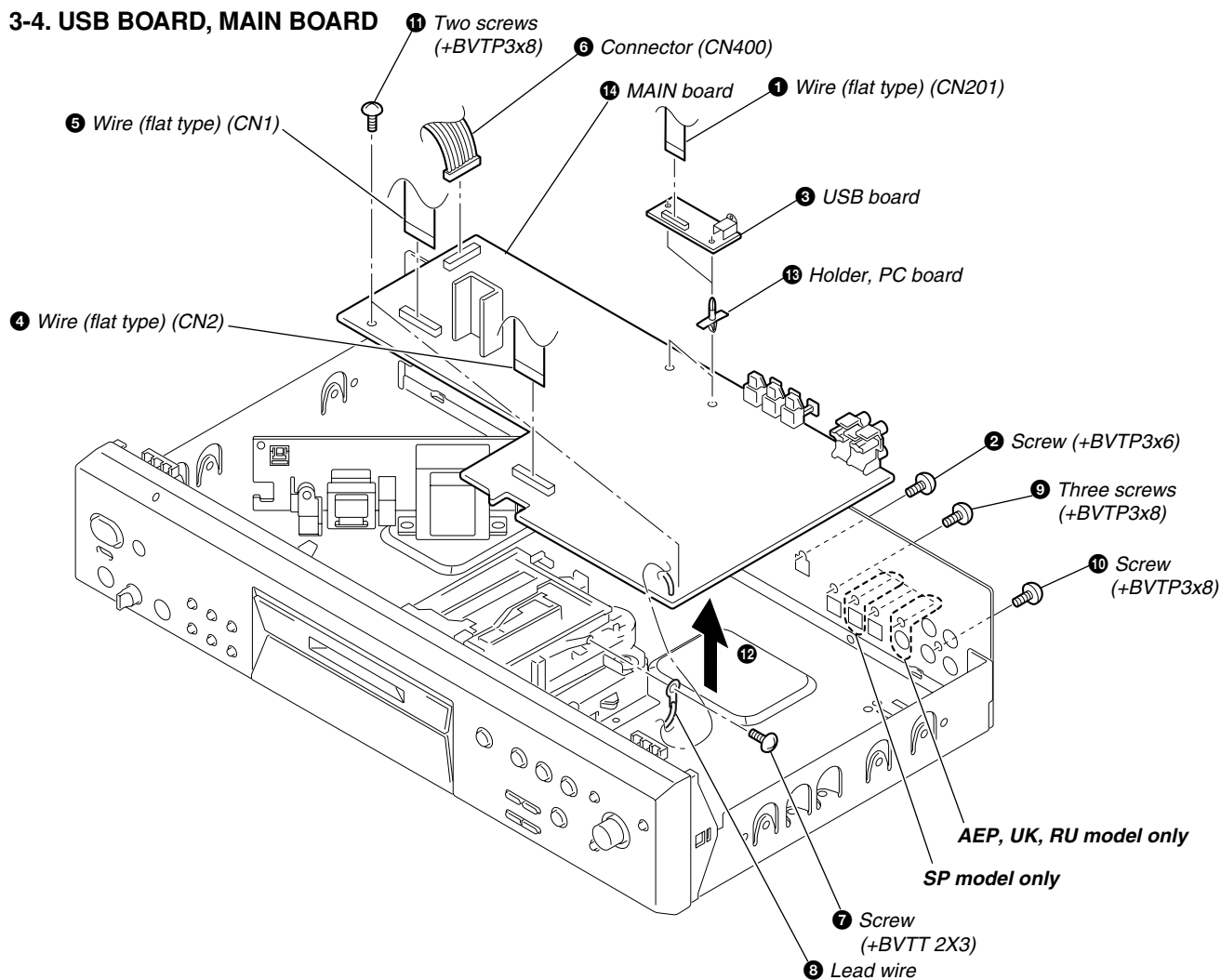
### 3-2. UPPER CASE



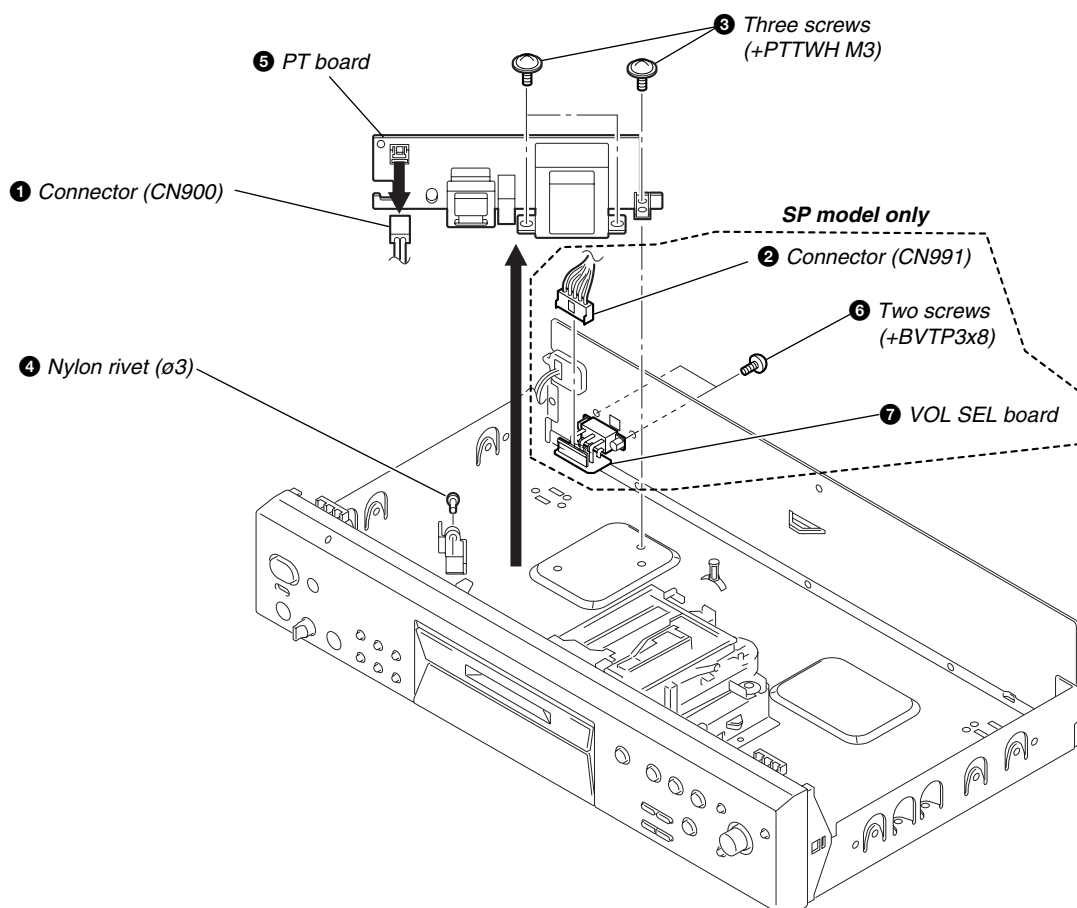
### 3-3. FRONT PANEL SECTION



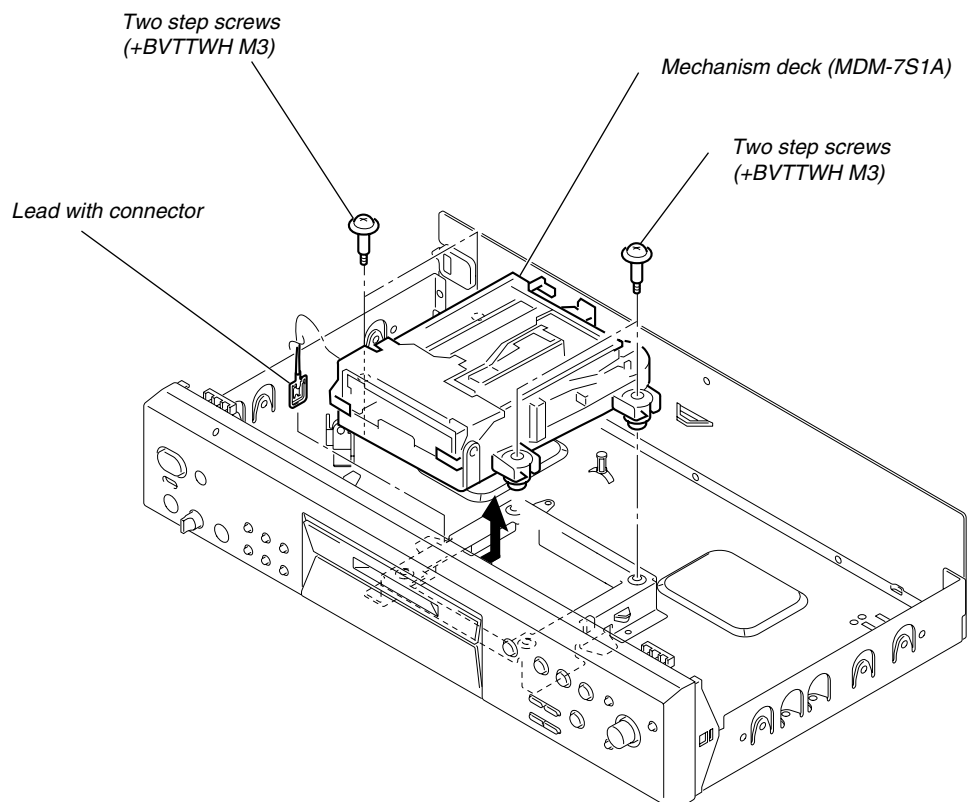
### 3-4. USB BOARD, MAIN BOARD



### 3-5. PT BOARD, VOL SEL BOARD (SP model only)



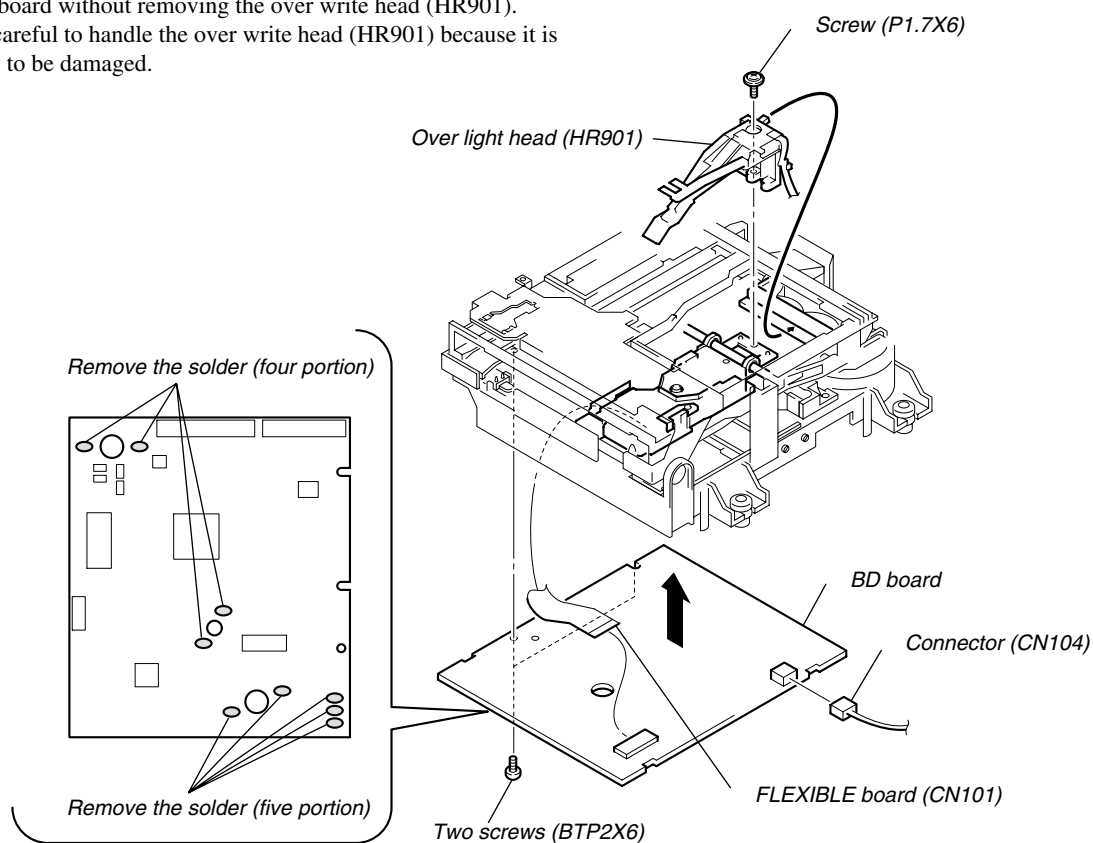
### 3-6. MECHANISM DECK SECTION (MDM-7S1A)



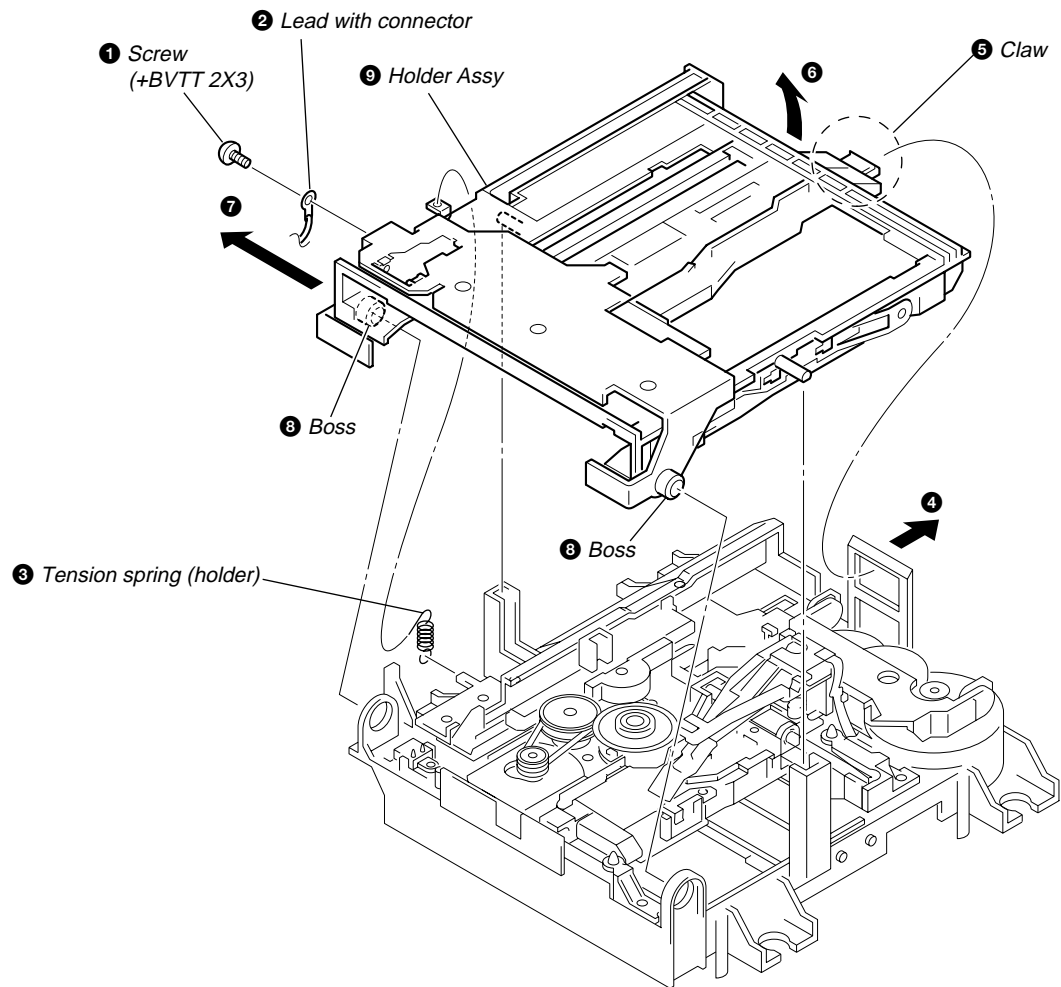
### 3-7. OVER LIGHT HEAD (HR901), BD BOARD

**Note 1:** If you disconnect the connector (CN104), you can remove the BD board without removing the over write head (HR901).

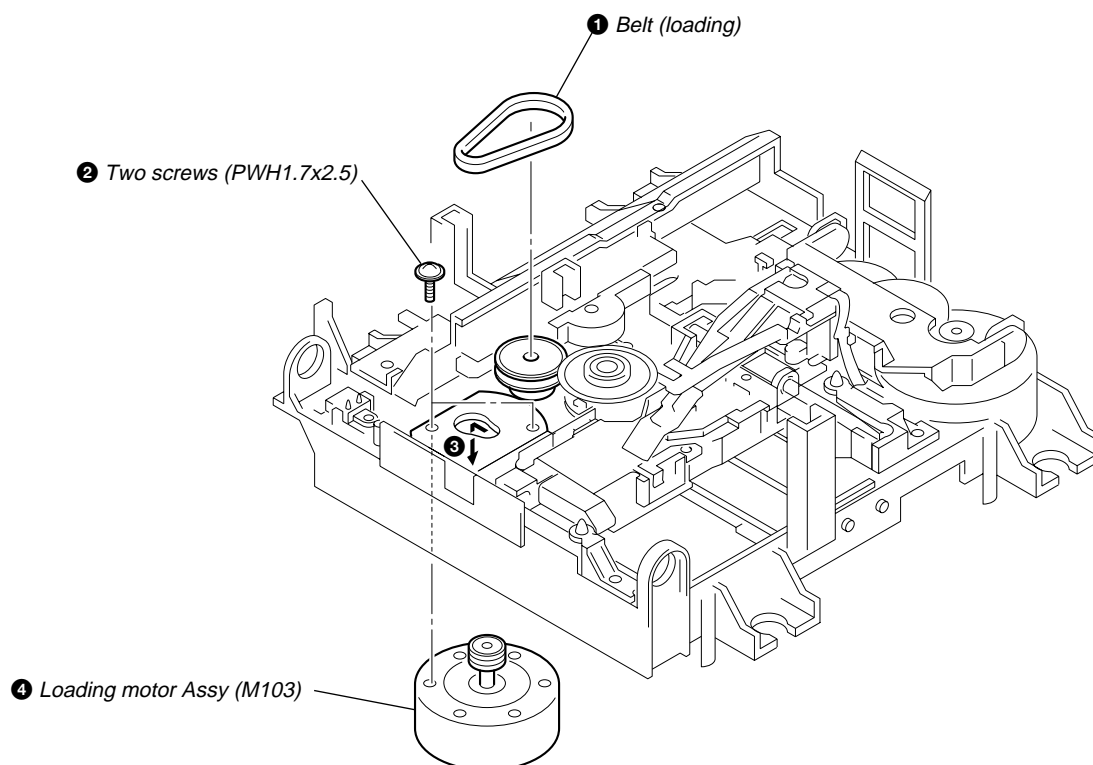
**Note 2:** Be careful to handle the over write head (HR901) because it is easy to be damaged.



### 3-8. HOLDER ASSY

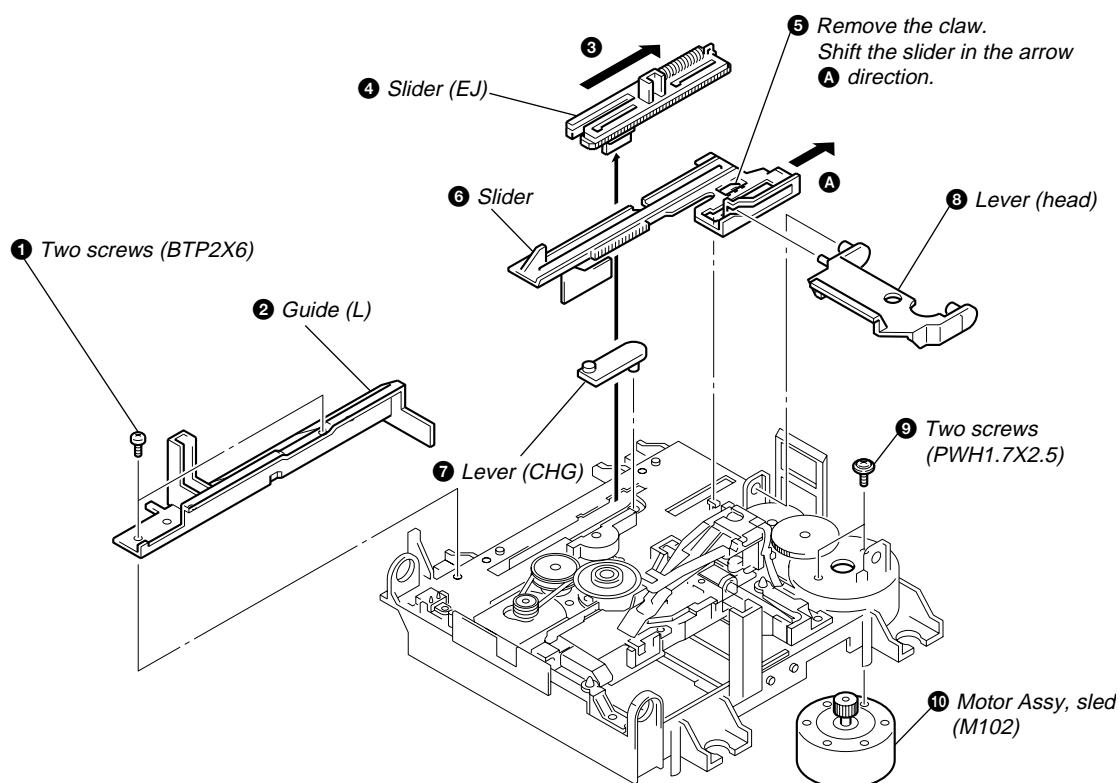


### 3-9. LOADING MOTOR ASSY (M103)

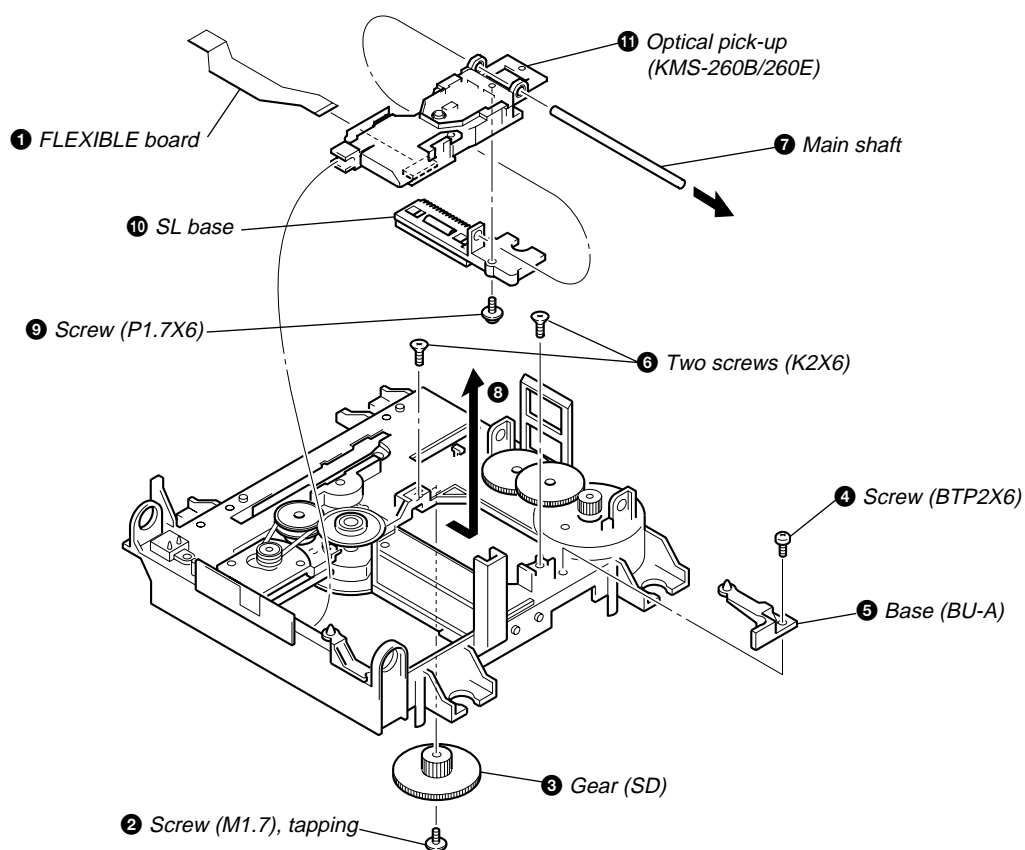




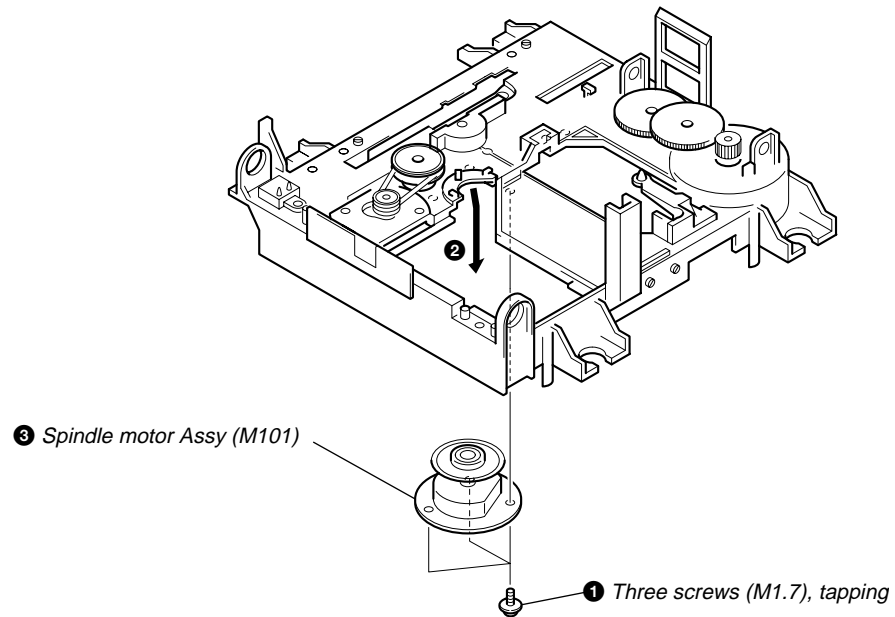
## 3-10. SLED MOTOR ASSY (M102), SLIDER



## 3-11. OPTICAL PICK-UP (KMS-260B/260E)


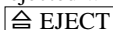



3-12. SPINDLE MOTOR ASSY (M101)




## SECTION 4 TEST MODE

### 4-1. PRECAUTIONS FOR USE OF TEST MODE





- As loading related operations will be performed regardless of the test mode operations being performed, be sure to check that the disc is stopped before setting and removing it.  
Even if the  button is pressed while the disc is rotating during continuous playback, continuous recording, etc., the disc will not stop rotating.  
Therefore, it will be ejected while rotating.  
Be sure to press the  button after pressing the  button and the rotation of disc is stopped.


#### 4-1-1. Recording laser emission mode and operating buttons



- Continuous recording mode (CREC 1MODE) (C35)
- Laser power check mode (LDPWR CHECK) (C13)
- Laser power adjustment mode (LDPWR ADJUST) (C04)
- Iop check (Iop Compare) (C27)
- Iop value nonvolatile writing (Iop NV Save) (C06)
- Traverse (MO) check (EF MO CHECK) (C14)
- Traverse (MO) adjustment (EF MO ADJUST) (C07)
- When pressing the  button.

### 4-2. SETTING THE TEST MODE

The following are two methods of entering the test mode.

**Procedure 1:** While pressing the  knob and  button, connect the power plug to an outlet, and release the  knob and  button.

When the test mode is set, “[Check]” will be displayed. Rotating the  knob switches between the following three groups; ... ↔ Check ↔ Service ↔ Develop ↔ ....


**Procedure 2:** While pressing the  knob, connect the power plug to the outlet and release the  knob.  
When the test mode is set, “TEMP CHECK” will be displayed. By setting the test mode using this method, only the “Check” group of method 1 can be executed.

**NOTE:** Do not use the test mode in the [Develop] group.




If used, the unit may not operate normally.

If the [Develop] group is set accidentally, press the  button immediately to exit the [Develop] group.

### 4-3. EXITING THE TEST MODE

Press the  button. The disc is ejected when loaded, and “Standby” display blinks, and the STANDBY state is set.




### 4-4. BASIC OPERATIONS OF THE TEST MODE

All operations are performed using the  knob,  button, and  button.

The functions of these buttons are as follows.

| Function name  |               | Function                        |
|----------------|---------------|---------------------------------|
| MENU/NO button |               | Cancel or move to top hierarchy |
| YES button     |               | Set                             |
| AMS knob       | Left or Right | Select                          |
|                | Push          | Set submenu                     |

### 4-5. SELECTING THE TEST MODE

There are 25 types of test modes as shown below. The groups can be switched by rotating the  knob. After selecting the group to be used, press the  button. After setting a certain group, rotating the  knob switches between these modes. Refer to “Group” in the table for details selected.

All adjustments and checks during servicing can be performed in the test mode in the Service group.

**NOTE:** Do not use the test mode in the [Develop] group.

If used, the unit may not operate normally.

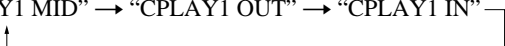
If the [Develop] group is set accidentally, press the  button immediately to exit the [Develop] group.

| Display     | No. | Details  | Mark | Group |         |
|-------------|-----|--|------|-------|---------|
|             |     |  |      | Check | Service |
| AUTO CHECK  | C01 | Automatic self-diagnosis   |      |       | ○       |
| Err Display | C02 | Error history display, clear   |      |       | ○       |
| TEMP ADJUS  | C03 | Temperature compensation offset adjustment                               |      |       | ○       |
| LDPWR ADJUS | C04 | Laser power adjustment   |      |       | ○       |
| Iop Write   | C05 | Iop data writing   |      |       | ○       |
| Iop NV Save | C06 | Writes current Iop value in read nonvolatile memory using microprocessor |      |       | ○       |
| EF MO ADJUS | C07 | Traverse (MO) adjustment   |      |       | ○       |
| EF CD ADJUS | C08 | Traverse (CD) adjustment   |      |       | ○       |
| FBIAS ADJUS | C09 | Focus bias adjustment  |      |       | ○       |
| AG Set (MO) | C10 | Focus, tracking gain adjustment (MO)                                     |      |       | ○       |
| AG Set (CD) | C11 | Focus, tracking gain adjustment (CD)                                     |      |       | ○       |
| TEMP CHECK  | C12 | Temperature compensation offset check                                    |      | ○     | ○       |
| LDPWR CHECK | C13 | Laser power check  |      | ○     | ○       |
| EF MO CHECK | C14 | Traverse (MO) check  |      | ○     | ○       |
| EF CD CHECK | C15 | Traverse (CD) check  |      | ○     | ○       |
| FBIAS CHECK | C16 | Focus bias check   |      | ○     | ○       |
| ScurveCHECK | C17 | S-curve check  | ×    | ○     |         |
| VERIFYMODE  | C18 | Nonvolatile memory check   | ×    | ○     |         |
| DETRK CHECK | C19 | Detrack check  | ×    | ○     |         |
| 0920 CHECK  | C25 | Most circumference check   | ×    | ○     |         |
| Iop Read    | C26 | Iop data display   |      | ○     | ○       |
| Iop Compare | C27 | Comparison with initial Iop value written in nonvolatile memory          |      | ○     | ○       |
| ADJ CLEAR   | C28 | Initialization of nonvolatile memory for adjustment values               |      |       | ○       |
| INFORMATION | C31 | Display of microprocessor version, etc.                                  |      | ○     | ○       |
| CPLAY1MODE  | C34 | Continuous playback mode   |      | ○     | ○       |
| CREC 1MODE  | C35 | Continuous recording mode  |      | ○     | ○       |

- For details of each adjustment mode, refer to “5. Electrical Adjustments”.
- For details of “Err Display”, refer to “Self-Diagnosis Function” on page 3.
- If a different mode has been selected by mistake, press the **[MENU/NO]** button to exit that mode.
- Modes with (X) in the Mark column are not used for servicing and therefore are not described in detail. If these modes are set accidentally, press the **[MENU/NO]** button to exit the mode immediately.

#### 4-5-1. Operating the Continuous Playback Mode

- Entering the continuous playback mode
  - ① Set the disc in the unit. (Whichever recordable discs or discs for playback only are available.)
  - ② Rotate the **[◀◀ AMS ▶▶]** knob and display “CPLAY1 MODE”(C34).
  - ③ Press the **[YES]** button to change the display to “CPLAY1 MID”.
  - ④ When access completes, the display changes to “C = 0000 AD = 00”.

**Note :** The numbers “0” displayed show you error rates and ADER.
- Changing the parts to be played back
  - ① Press the **[YES]** button during continuous playback to change the display as below.  
 “CPLAY1 MID” → “CPLAY1 OUT” → “CPLAY1 IN”  


When pressed another time, the parts to be played back can be moved.
  - ② When access completes, the display changes to “C = 0000 AD = 00”.

**Note :** The numbers “0” displayed show you error rates and ADER.
- Ending the continuous playback mode
  - ① Press the **[MENU/NO]** button. The display will change to “CPLAY1 MODE”(C34).
  - ② Press the **[EJECT]** button to remove the disc.

**Note :** The playback start addresses for IN, MID, and OUT are as follows.

IN    40h cluster  
 MID   300h cluster  
 OUT   700h cluster

#### 4-5-2. Operating the Continuous Recording Mode (Use only when performing self-recording/playback check.)

##### 1. Entering the continuous recording mode

- ① Set a recordable disc in the unit.
- ② Rotate the [◀◀ AMS ▶▶] knob and display “CREC 1MODE” (C35).
- ③ Press the [YES] button to change the display to “CREC1 MID”.
- ④ When access completes, the display changes to “CREC 1 (0000)” and **REC** lights up.

**Note :** The numbers “0” displayed shows you the recording position addresses.

##### 2. Changing the parts to be recorded

- ① When the [YES] button is pressed during continuous recording, the display changes as below.

“CREC1 MID” → “CREC1 OUT” → “CREC1 IN”

When pressed another time, the parts to be recorded can be changed. **REC** goes off.

- ② When access completes, the display changes to “CREC 1 (0000)” and **REC** lights up.

**Note :** The numbers “0” displayed shows you the recording position addresses.

##### 3. Ending the continuous recording mode

- ① Press the [MENU/NO] button. The display changes to “CREC1 MODE” (C35) and **REC** goes off.
- ② Press the [EJECT] button to remove the disc.

**Note 1 :** The recording start addresses for IN, MID, and OUT are as follows.

IN 40h cluster  
MID 300h cluster  
OUT 700h cluster

**Note 2 :** The [MENU/NO] button can be used to stop recording anytime.

**Note 3 :** Do not perform continuous recording for long periods of time above 5 minutes.

**Note 4 :** During continuous recording, be careful not to apply vibration.

#### 4-6. FUNCTIONS OF OTHER BUTTONS

| Function           | Contents   |
|--------------------|--|
| ▷                  | Sets continuous playback when pressed in the STOP state. When pressed during continuous playback, the tracking servo turns ON/OFF. |
| ■                  | Stops continuous playback and continuous recording.  |
| ▶▶                 | The sled moves to the outer circumference only when this is pressed.   |
| ◀◀                 | The sled moves to the inner circumference only when this is pressed.   |
| REC MODE           | Switches between the pit and groove modes when pressed.  |
| PLAY MODE          | Switches the spindle servo mode (CLV S ↔ CLV A).   |
| LEVEL/DISPLAY/CHAR | Switches the displayed contents each time the button is pressed.   |
| ⏏                  | Ejects the disc.   |
| REPEAT             | Exits the test mode.   |

#### 4-7. TEST MODE DISPLAYS

Each time the [LEVEL/DISPLAY/CHAR] button is pressed, the display changes in the following order.

When CPLAY and CREC are started, the display will forcibly be switched to the error rate display as the initial mode.

##### 1. Mode display

Displays “TEMP ADJUS” (C03), “CPLAY1MODE” (C34), etc.

##### 2. Error rate display

Displays the error rate in the following way.

C = □□□□ AD = □□

C = Indicates the C error.

AD = Indicates ADER.

##### 3. Address display

The address is displayed as follows. (MO:recordable disc, CD:playback only disc)

If the [REC MODE] button is pressed, the display switches from groove to pit or vice versa.

h = □□□□ s = □□□□ (MO pit and CD)

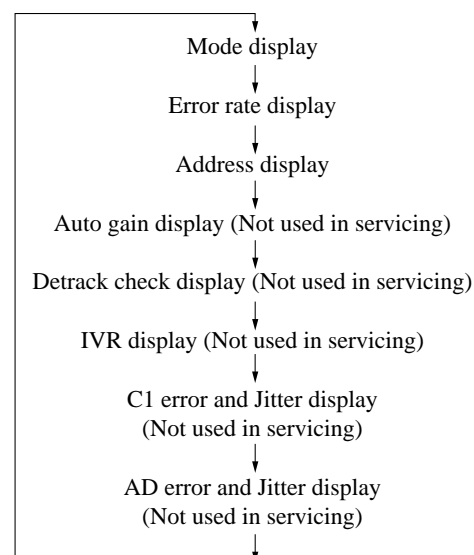
h = □□□□ a = □□□□ (MO groove)

h = Indicates the header address.

s = Indicates the SUBQ address.

a = Indicates the ADIP address.

**Note:** “-” is displayed when the address cannot be read.



#### 4-8. MEANINGS OF OTHER DISPLAYS

| Display                   | Contents                  |                            |
|---------------------------|---------------------------|----------------------------|
|                           | When Lit                  | When Off                   |
| ▷                         | Servo ON                  | Servo OFF                  |
| II                        | Tracking servo OFF        | Tracking servo ON          |
| REC                       | Recording mode ON         | Recording mode OFF         |
| SYNC                      | CLV low speed mode        | CLV normal mode            |
| L.SYNC                    | ABCD adjustment completed |                            |
| OVER                      | Tracking offset cancel ON | Tracking offset cancel OFF |
| B/1                       | Tracking auto gain OK     |                            |
| A-/REP                    | Focus auto gain OK        |                            |
| TRACK/(LP4)/calender fram | Pit                       | Groove                     |
| DISC/LP2                  | High reflection           | Low reflection             |
| SLEEP/SHUF                | CLV S                     | CLV A                      |
| MONO                      | CLV LOCK                  | CLV UNLOCK                 |

#### 4-9. AUTOMATIC SELF-DIAGNOSIS FUNCTION

This test mode performs CREC and CPLAY automatically for mainly checking the characteristics of the optical pick-up.

To perform this test mode, the laser power must first be checked.

Perform AUTO CHECK after the laser power check and Iop check.

##### Procedure

1. Press the **YES** button. If “LDPWR ミチェック ” is displayed, it means that the laser power check has not been performed. In this case, perform the laser power check and Iop compare, and then repeat from step 1.
2. If a disc is in the mechanical deck, it will be ejected forcibly.  
“DISC IN” will be displayed in this case. Load a test disc (MDW-74/GA1) which can be recorded.
3. If a disk is loaded at step 2, the check will start automatically.
4. When “XX CHECK” is displayed, the item corresponding to XX will be performed.  
When “06 CHECK” completes, the disc loaded at step 2 will be ejected. “DISC IN” will be displayed. Load the check disc (MD) TDYS-1.
5. When the disc is loaded in step 4, the check will automatically be resumed from “07 CHECK”.
6. After completing to test item 12, check OK or NG will be displayed. If all items are OK, “CHECK ALL OK” will be displayed. If any item is NG, it will be displayed as “NG:xxxx”.

When “CHECK ALL OK” is displayed, it means that the optical pick-up is normal. Check the operations of the other spindle motor, thread motor, etc.

When displayed as “NG:xxxx”, it means that the optical pick-up is faulty. In this case, replace the optical pick-up.

#### 4-10. INFORMATION

Display the software version.

##### Procedure

1. If displayed as “INFORMATION”, press the **YES** button.
2. The software version will be displayed.
3. Press the **MENU/NO** button to end this mode.

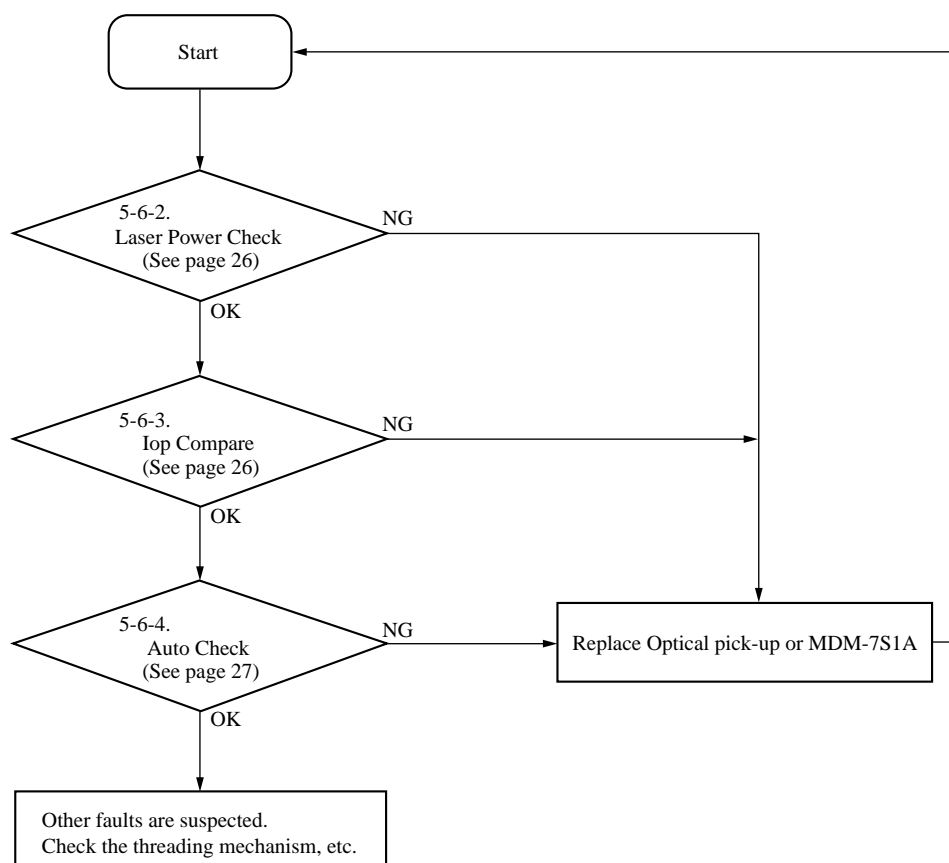
## SECTION 5 ELECTRICAL ADJUSTMENTS

**Note :** 260B: KMS-260B  
260E: KMS-260E

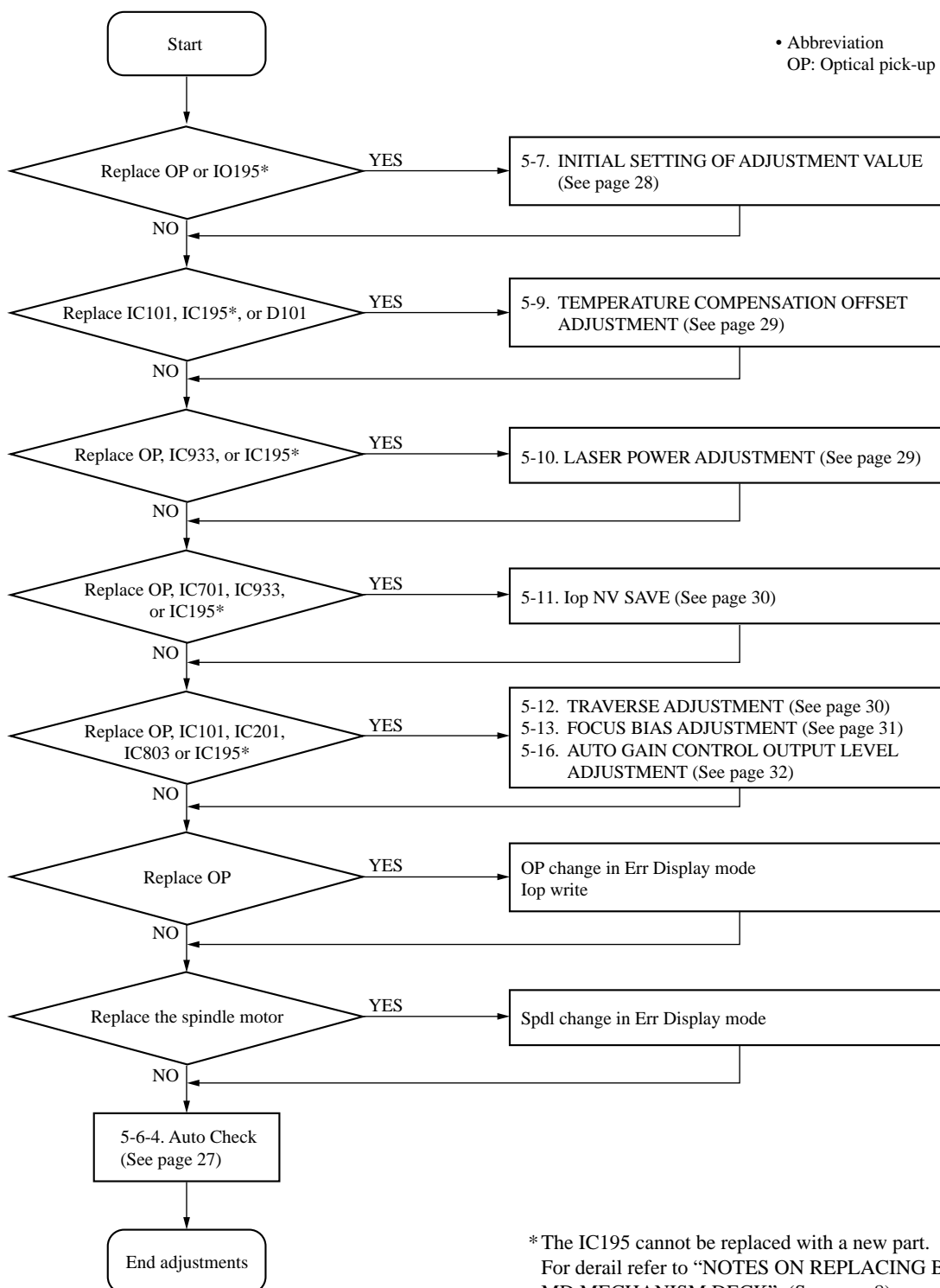
### 5-1. PARTS REPLACEMENT AND ADJUSTMENT

If malfunctions caused by Optical pick-up such as sound skipping are suspected, follow the following check.

#### Check before replacement



## Adjustment flow



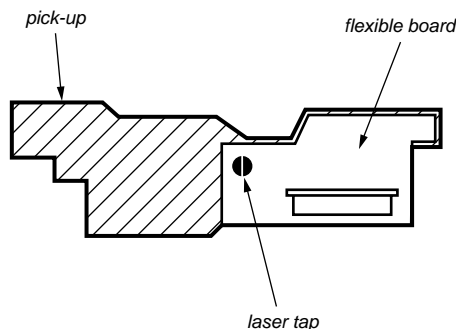


## 5-2. PRECAUTIONS FOR CHECKING LASER DIODE EMISSION

To check the emission of the laser diode during adjustments, never view directly from the top as this may lose your eye-sight.

## 5-3. PRECAUTIONS FOR USE OF OPTICAL PICK-UP (KMS-260B/260E)

As the laser diode in the optical pick-up is easily damaged by static electricity, solder the laser tap of the flexible board when using it. Before disconnecting the connector, desolder first. Before connecting the connector, be careful not to remove the solder. Also take adequate measures to prevent damage by static electricity. Handle the flexible board with care as it breaks easily.



**Optical pick-up flexible board**

## 5-4. PRECAUTIONS FOR ADJUSTMENTS

- 1) When replacing the following parts, perform the adjustments and checks with ○ in the order shown in the following table.
- 2) Set the test mode when performing adjustments.  
After completing the adjustments, exit the test mode.  
Perform the adjustments and checks in “group S” of the test mode.
- 3) Perform the adjustments to be needed in the order shown.
- 4) Use the following tools and measuring devices.
  - Check Disc (MD) TDYS-1 (Parts No. 4-963-646-01)
  - Test Disk (MDW-74/GA-1) (Parts No. 4-229-747-01)
  - Laser power meter LPM-8001 (Parts No. J-2501-046-A)
 or  
 MD Laser power meter 8010S (Parts No. J-2501-145-A)
  - Oscilloscope (Measure after performing CAL of prove.)
  - Digital voltmeter
  - Thermometer
  - Jig for checking BD board waveform (Parts No. : J-2501-196-A)
- 5) When observing several signals on the oscilloscope, etc., make sure that VC and ground do not connect inside the oscilloscope.  
(VC and ground will become short-circuited.)
- 6) Using the above jig enables the waveform to be checked without the need to solder.  
(Refer to Servicing Note on page 6.)
- 7) As the disc used will affect the adjustment results, make sure that no dusts nor fingerprints are attached to it.

| Adjustment                                | Parts to be replaced |       |       |       |       |        |      |       |
|---|----------------------|-------|-------|-------|-------|--------|------|-------|
|   | Optical Pick-up      | IC101 | IC701 | IC201 | IC933 | IC195* | D101 | IC803 |
| 5-7. Initial setting of adjustment values | ○                    | ×     | ×     | ×     | ×     | ○      | ×    | ×     |
| 5-8. Recording of Iop information         | ○                    | ×     | ×     | ×     | ×     | ○      | ×    | ×     |
| 5-9. TEMP ADJUST                          | ×                    | ○     | ×     | ×     | ×     | ○      | ○    | ×     |
| 5-10. Laser power adjustment              | ○                    | ×     | ×     | ×     | ○     | ○      | ×    | ×     |
| 5-11. Iop NV Save                         | ○                    | ×     | ○     | ×     | ○     | ○      | ×    | ×     |
| 5-12. Traverse adjustment                 | ○                    | ○     | ×     | ×     | ×     | ○      | ×    | ○     |
| 5-13. Focus bias adjustment               | ○                    | ○     | ×     | ○     | ×     | ○      | ×    | ○     |
| 5-16. Auto gain adjustment                | ○                    | ○     | ×     | ○     | ×     | ○      | ×    | ○     |
| 5-6-4. AUTO CHECK                         | ○                    | ○     | ×     | ○     | ○     | ○      | ×    | ○     |

\*The IC195 cannot be replaced with a new part.

For detail refer to “NOTES ON REPLACING BD BOARD OR MD MECHANISM DECK” (See page 8).

## 5-5. USING THE CONTINUOUSLY RECORDED DISC

- \* This disc is used in focus bias adjustment and error rate check.
- The following describes how to create a continuous recording disc.
1. Insert a disc (blank disc) commercially available.
  2. Rotate the **◀◀ AMS ▶▶** knob and display “CREC1 MODE” (C35).
  3. Press the **YES** button again to display “CREC1 MID”.
  4. Press the **LEVEL/DISPLAY/CHAR** button.  
Display “CREC (0300)” and start to recording.
  5. Complete recording within 5 minutes.
  6. Press the **MENU/NO** button and stop recording .
  7. Press the **EJECT** button and remove the disc.

The above has been how to create a continuous recorded data for the focus bias adjustment and error rate check.

### Note :

- Be careful not to apply vibration during continuous recording.

## 5-6. CHECKS PRIOR TO REPAIRS

These checks are performed before replacing parts according to “approximate specifications” to determine the faulty locations. For details, refer to “Checks Prior to Parts Replacement and Adjustments” (See page 8).

### 5-6-1. Temperature Compensation Offset Check

When performing adjustments, set the internal temperature and room temperature to 22 to 28°C.

Checks cannot be performed properly if performed after some time from power ON due to the rise in the temperature of the IC and diode, etc. So, perform the checks again after waiting some time.

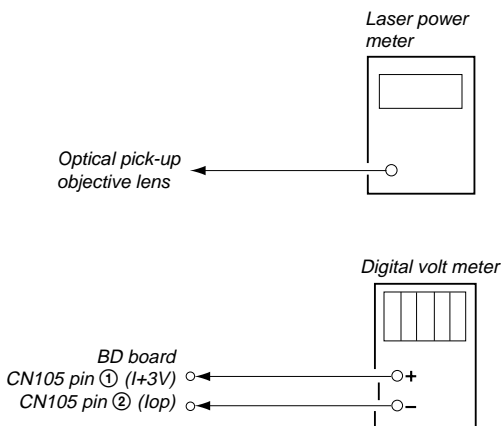
#### Checking Procedure:

1. Rotate the **◀◀ AMS ▶▶** knob to display “TEMP CHECK”. (C12)
2. Press the **YES** button.
3. “T=@@ (##) [OK]” should be displayed. If “T=@@ (##) [NG]” is displayed, it means that the results are bad.  
(@@ indicates the current value set, and ## indicates the value written in the non-volatile memory.)

### 5-6-2. Laser Power Check

Before checking, check the Iop value of the optical pick-up.  
(Refer to 5-8. Recording and Displaying Iop Information.)

#### Connection :



#### Checking Procedure:

1. Set the laser power meter on the objective lens of the optical pick-up. (When it cannot be set properly, press the **◀◀** button or **▶▶** button to move the optical pick-up.)  
Connect the digital volt meter to CN105 pin ① (I+3V) and CN105 pin ② (Iop).
2. Then, rotate the **◀◀ AMS ▶▶** knob and display “LDPWR CHECK”.
3. Press the **YES** button once and display “L 0.93 mW \$ 000”.  
Check that the reading of the laser power meter become the specified value.
4. Press the **YES** button once more and display “L 7.25 mW \$ 000”.  
Check that the reading the laser power meter and digital volt meter satisfy the specified value.

#### Specified Value :

Laser power meter reading : L 0.93mW: 0.85-0.91mW (260B)  
0.90-0.96mW (260E)  
L 7.25mW: 6.80-7.20mW (260B)  
7.00-7.50mW (260E)

Digital voltmeter reading : Optical pick-up displayed value ± 10%

(Optical pick-up label)

KMS260B  
20101  
H0576

(For details of the method for checking this value, refer to “5-8. Recording and Displaying Iop Information”.)

Iop = 57.6 mA in this case

Iop (mA) = Digital voltmeter reading (mV)/1 (Ω)

5. Press the **MENU/NO** button and display “LDPWR CHECK” and stop the laser emission.  
(The **MENU/NO** button is effective at all times to stop the laser emission.)

**Note 1:** After step 4, each time the **YES** button is pressed, the display will be switched between “L 0.73 mW \$ 000”, “L 6.40 mW \$ 000”, and “L Wp ホセ イ 000”. Nothing needs to be performed here.

### 5-6-3. Iop Compare

The current Iop value at laser power 7 mw output and reference Iop value (set at shipment) written in the nonvolatile memory are compared, and the rate of increase/decrease will be displayed in percentage.

**Note:** Perform this function with the optical pick-up set at room temperature.

#### Procedure

1. Rotate the **◀◀ AMS ▶▶** knob to display “Iop Compare”.
2. Press the **YES** button and start measurements.
3. When measurements complete, the display changes to Iop [STOP] → Iop [7.0mW] → “±xx%yy”.  
xx is the percentage of increase/decrease, and OK or NG is displayed at yy to indicate whether the percentage of increase/decrease is within the allowable range.
4. Press the **MENU/NO** button to end.

### 5-6-4. Auto Check

This test mode performs CREC and CPLAY automatically for mainly checking the characteristics of the optical pick-up. To perform this test mode, the laser power must first be checked. Perform Auto Check after the laser power check and Iop compare.

#### Procedure

1. Press the **[YES]** button. If “LDPWR ミチェック” is displayed, it means that the laser power check has not been performed. In this case, perform the laser power check and Iop compare, and then repeat from step 1.
2. If a disk is in the mechanical deck, it will be ejected forcibly. “DISC IN” will be displayed in this case. Load a test disc (MDW-74/GA1) which can be recorded.
3. If a disk is loaded at step 2, the check will start automatically.
4. When “XX CHECK” is displayed, the item corresponding to XX will be performed.  
When “06 CHECK” completes, the disc loaded at step 2 will be ejected. “DISC IN” will be displayed. Load the check disc (MD) TDYS-1.
5. When the disc is loaded, the check will automatically be resumed from “07 CHECK”.
6. After completing to test item 12, check OK or NG will be displayed. If all items are OK, “CHECK ALL OK” will be displayed. If any item is NG, it will be displayed as “NG:xxxx”.

When “CHECK ALL OK” is displayed, it means that the optical pick-up is normal. Check the operations of the other spindle motor, thread motor, etc.

When displayed as “NG:xxxx”, it means that the optical pick-up is faulty. In this case, replace the optical pick-up.

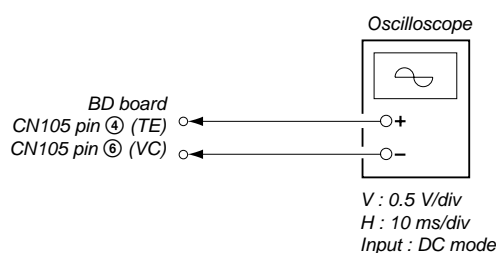
### 5-6-5. Other Checks

All the following checks are performed by the Auto Check mode. They therefore need not be performed in normal operation.

1. Load a continuously recorded test disc (MDW-74/GA1).  
(Refer to “5-5. Using the Continuously Recorded Disc”.)

### 5-6-6. Traverse Check

#### Connection :

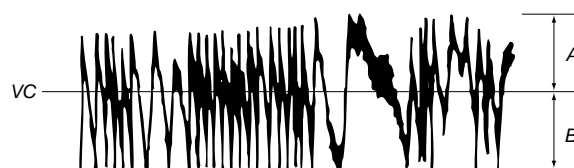


#### Checking Procedure:

1. Connect an oscilloscope to CN105 pin ④ (TE) and CN105 pin ⑥ (VC) of the BD board.
2. Load a test disc (MDW-74/GA1). (Refer to Note 1 (see page 28.)
3. Press the **[▶▶]** button and move the optical pick-up outside the pit.
4. Rotate the **[◀◀AMS▶▶]** knob and display “EF MO CHECK” (C14).
5. Press the **[YES]** button and display “EFB = **[MO-R]**”.  
(Laser power READ power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)

6. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not rotate the **[AMS]** knob.  
(Read power traverse checking)

#### (Traverse Waveform)

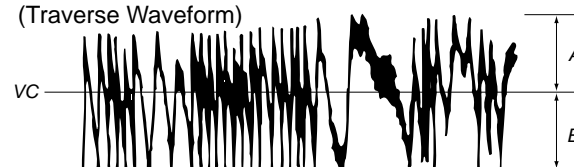


Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$

7. Press the **[YES]** button and display “EFB = **[MO-W]**”.
8. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not rotate the **[◀◀AMS▶▶]** knob.  
(Write power traverse checking)

#### (Traverse Waveform)

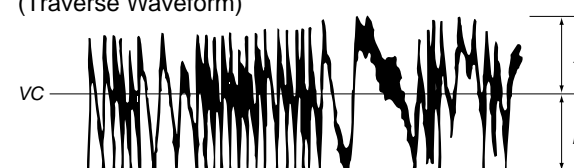


Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$

9. Press the **[YES]** button display “EFB = **[MO-P]**”.  
Then, the optical pick-up moves to the pit area automatically and servo is imposed.
10. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not rotate the **[◀◀AMS▶▶]** knob.

#### (Traverse Waveform)



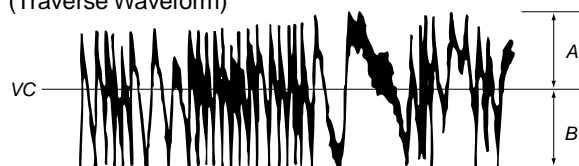
Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$

11. Press the **[YES]** button display “EF MO CHECK” (C14).  
The disc stops rotating automatically.
12. Press the **[EJECT]** button and remove the disc.
13. Load the check disc (MD) TDYS-1.
14. Rotate the **[◀◀AMS▶▶]** knob and display “EF CD CHECK” (C15).
15. Press the **[YES]** button and display “EFB = **[CD]**”. Servo is imposed automatically.

16. Observe the waveform of the oscilloscope, and check that the specified value is satisfied. Do not rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob.

(Traverse Waveform)



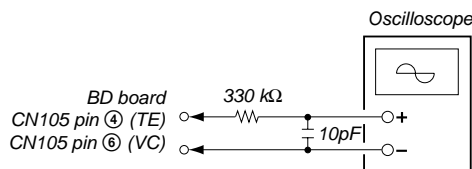
Specified value : Below 10% offset value

$$\text{Offset value (\%)} = \frac{|A - B|}{2(A + B)} \times 100$$

17. Press the  $\boxed{\text{YES}}$  button and display “EF CD CHECK” (C15).  
18. Press the  $\boxed{\text{EJECT}}$  button and remove the check disc (MD) TDYS-1.

**Note 1 :** MO reading data will be erased during if a recorded disc is used in this adjustment.

**Note 2 :** If the traverse waveform is not clear, connect the oscilloscope as shown in the following figure so that it can be seen more clearly.



### 5-6-7. Focus Bias Check

Change the focus bias and check the focus tolerance amount.

#### Checking Procedure :

- Load a continuously recorded test disc (MDW-74/GA1). (Refer to “5-5. Using the Continuously Recorded Disc”.)
- Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob and display “CPLAY1 MODE”(C34).
- Press the  $\boxed{\text{YES}}$  button and display “CPLAY1 MID”.
- The display change to “C = 0000 AD = 00”.
- Press the  $\boxed{\text{MENU/NO}}$  button.
- Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob and display “FBIAS CHECK”(C16).
- Press the  $\boxed{\text{YES}}$  button and display “0000/00 c = 00”.  
The first four digits indicate the C error rate, the two digits after [/] indicate ADER, and the 2 digits after [c =] indicate the focus bias value.  
Check that the C error is below 50 and ADER is below 2.
- Press the  $\boxed{\text{YES}}$  button and display “0000/00 b = 00”.  
Check that the C error is below 100 and ADER is below 2.
- Press the  $\boxed{\text{YES}}$  button and display “0000/00 a = 00”.  
Check that the C error is below 220 and ADER is below 2.
- Press the  $\boxed{\text{MENU/NO}}$  button, next press the  $\boxed{\text{EJECT}}$  button, and remove the test disc.

### 5-6-8. C PLAY Check

#### MO Error Rate Check

##### Checking Procedure :

- Load a continuously recorded test disc (MDW-74/GA1). (Refer to “5-5. Using the Continuously Recorded Disc”.)
- Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob and display “CPLAY1 MODE”(C34).
- Press the  $\boxed{\text{YES}}$  button and display “CPLAY1 MID”.
- The display changes to “C = 0000 AD = 00”.
- If the C error rate is below 50, check that ADER is 00.
- Press the  $\boxed{\text{MENU/NO}}$  button, stop playback, press the  $\boxed{\text{EJECT}}$  button, and test disc.

### CD Error Rate Check

#### Checking Procedure :

- Load a check disc (MD) TDYS-1.
- Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob and display “CPLAY1 MODE”(C34).
- Press the  $\boxed{\text{YES}}$  button twice and display “CPLAY1 MID”.
- The display changes to “C = 0000 AD = 00”.
- Check that the C error rate is below 50.
- Press the  $\boxed{\text{MENU/NO}}$  button, stop playback, press the  $\boxed{\text{EJECT}}$  button, and the test disc.

### 5-6-9. Self-Recording/playback Check

Prepare a continuous recording disc using the unit to be repaired and check the error rate.

#### Checking Procedure :

- Insert a recordable test disc (MDW-74/GA1) into the unit.
- Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob to display “CREC 1MODE”(C35).
- Press the  $\boxed{\text{YES}}$  button to display the “CREC1 MID”.
- When recording starts, “**REC**” is displayed, this becomes “CREC 1 (@ @ @ @)” (@ @ @ @ is the address), and recording starts.
- About 1 minute later, press the  $\boxed{\text{MENU/NO}}$  button to stop continuous recording.
- Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob to display “CPLAY1MODE”(C34).
- Press the  $\boxed{\text{YES}}$  button to display “C PLAY 1MID”.
- “C = 0000 AD = 00” will be displayed.
- Check that the C error becomes below 50 and the AD error below 2.
- Press the  $\boxed{\text{MENU/NO}}$  button to stop playback, and press the  $\boxed{\text{EJECT}}$  button and remove the disc.

### 5-7. INITIAL SETTING OF ADJUSTMENT VALUE

#### Note:

Mode which sets the adjustment results recorded in the non-volatile memory to the initial setting value. However the results of the temperature compensation offset adjustment will not change to the initial setting value.

If initial setting is performed, perform all adjustments again excluding the temperature compensation offset adjustment.

For details of the initial setting, refer to “5-4. Precautions on Adjustments” and execute the initial setting before the adjustment as required.

#### Setting Procedure :

- Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob to display “ADJ CLEAR”(C28).
- Press the  $\boxed{\text{YES}}$  button. “Complete!” will be displayed momentarily and initial setting will be executed, after which “ADJ CLEAR”(C28) will be displayed.

## 5-8. RECORDING AND DISPLAYING THE Iop INFORMATION

The Iop data can be recorded in the non-volatile memory. The Iop value on the label of the optical pick-up and the Iop value after the adjustment will be recorded. Recording these data eliminates the need to read the label on the optical pick-up.

### Recording Procedure :

1. While pressing the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob and  $\blacksquare$  button, connect the power plug to the outlet, and release the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob and  $\blacksquare$  button.
2. Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob to display "[Service]", and press the  $\text{YES}$  button.
3. Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob to display "Iop Write" (C05), and press the  $\text{YES}$  button.
4. The display becomes Ref=@@.@ (@ is an arbitrary number) and the numbers which can be changed will blink.
5. Input the Iop value written on the optical pick-up.  
To select the number : Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob.  
To select the digit : Press the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob.
6. When the  $\text{YES}$  button is pressed, the display becomes "Measu=@@.@@" (@ is an arbitrary number).
7. As the adjustment results are recorded for the 6 value. Leave it as it is and press the  $\text{YES}$  button.
8. "Complete!" will be displayed momentarily. The value will be recorded in the non-volatile memory and the display will become "Iop Write" (C05).

### Display Procedure :

1. Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob to display "Iop Read" (C26).
2. "@@.@/##.##" is displayed and the recorded contents are displayed.  
@@.@ indicates the Iop value labeled on the pick-up.  
##.## indicates the Iop value after adjustment
3. To end, press the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  button or  $\text{MENU/NO}$  button to display "Iop Read" (C26).

## 5-9. TEMPERATURE COMPENSATION OFFSET ADJUSTMENT

Save the temperature data at that time in the non-volatile memory as 25 °C reference data.

### Note :

1. Usually, do not perform this adjustment.
2. Perform this adjustment in an ambient temperature of 22 °C to 28 °C. Perform it immediately after the power is turned on when the internal temperature of the unit is the same as the ambient temperature of 22 °C to 28 °C.
3. When D101 has been replaced, perform this adjustment after the temperature of this part has become the ambient temperature.

### Adjusting Procedure :

1. Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob and display "TEMPADJUS" (C03).
2. Press the  $\text{YES}$  button.
3. "TEMP =  $\square\square$  [OK]" and the current temperature data will be displayed.
4. To save the data, press the  $\text{YES}$  button.  
When not saving the data, press the  $\text{MENU/NO}$  button.
5. When the  $\text{YES}$  button is pressed, "TEMP =  $\square\square$  SAVE" will be displayed and turned back to "TEMP ADJUS" (C03) display then. When the  $\text{MENU/NO}$  button is pressed, "TEMPADJUS" (C03) will be displayed immediately.

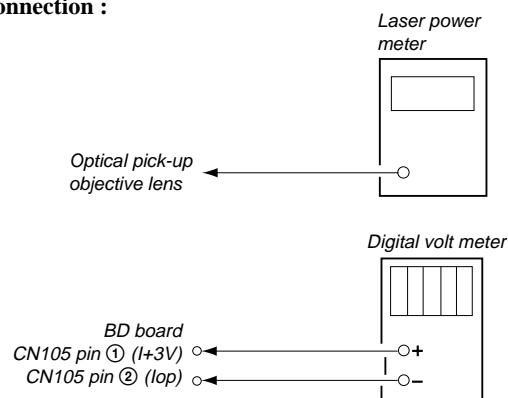
### Specified Value :

The "TEMP =  $\square\square$ " should be within "E0 - EF", "F0 - FF", "00 - 0F", "10 - 1F" and "20 - 2F".

## 5-10. LASER POWER ADJUSTMENT

Check the Iop value of the optical pick-up before adjustments. (Refer to 5-8. Recording and Displaying Iop Information.)

### Connection :



### Adjusting Procedure :

1. Set the laser power meter on the objective lens of the optical pick-up. (When it cannot be set properly, press the  $\llcorner$  button or  $\gg$  button to move the optical pick-up.)  
Connect the digital volt meter to CN105 pin ① (I+3V) and CN105 pin ② (Iop).
  2. Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob and display "LDPWR ADJUS" (C04).  
(Laser power : For adjustment)
  3. Press the  $\text{YES}$  button once and display "L 0.93 mW  $\square\square$ ".
  4. Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob so that the reading of the laser power meter becomes the specified value. Press the  $\text{YES}$  button after setting the range knob of the laser power meter, and save the adjustment results. ("L SAVE  $\square\square$ " will be displayed for a moment.)
  5. Then "L 7.25 mW  $\square\square$ " will be displayed.
  6. Rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob so that the reading of the laser power meter becomes the specified value, press the  $\text{YES}$  button and save it.
- Note :** Do not perform the emission with 7.25 mW more than 15 seconds continuously.
7. Then, rotate the  $\llcorner \llcorner \text{AMS} \gg \gg \lrcorner$  knob and display "LDPWR CHECK" (C13).
  8. Press the  $\text{YES}$  button once and display "L 0.93 mW  $\square\square$ ".  
Check that the reading of the laser power meter become the specified value.
  9. Press the  $\text{YES}$  button once more and display "L 7.25 mW  $\square\square$ ".  
Check that the reading the laser power meter and digital volt meter satisfy the specified value.  
Note down the digital voltmeter reading value.

### Specified Value :

Laser power meter reading : L 0.93mW : 0.85-0.91mW (260B)  
0.90-0.96mW (260E)  
L 7.25mW : 6.90-7.10mW (260B)  
7.20-7.30mW (260E)

Digital voltmeter reading : Optical pick-up displayed value  $\pm$  10%

### (Optical pick-up label)

KMS260B  
20101  
H0576

(For details of the method for checking this value, refer to "5-8. Recording and Displaying Iop Information".)

Iop = 57.6 mA in this case  
Iop (mA) = Digital voltmeter reading (mV)/1 ( $\Omega$ )

10. Press the **MENU/NO** button and display "LDPWR CHECK" and stop the laser emission.  
(The **MENU/NO** button is effective at all times to stop the laser emission.)
11. Rotate the **AMS** knob to display "Iop Write" (C05).
12. Press the **YES** button. When the display becomes Ref = @ @ @ .@ (@ is an arbitrary number), press the **YES** button to display "Measu=@ @ @ .@" (@ is an arbitrary number).
13. The numbers which can be changed will blink. Input the Iop value noted down at step 9.  
To select the number : Rotate the **AMS** knob.  
To select the digit : Press the **AMS** knob
14. When the **YES** button is pressed, "Complete!" will be displayed momentarily. The value will be recorded in the non-volatile memory and the display will become "Iop Write" (C05).

**Note 1:** After step 9, each time the **YES** button is pressed, the display will be switched between "L 0.73 mW \$ @@", "L 6.40 mW \$ @@", and "L Wp ホセ イ \$ @@" . Nothing needs to be performed here.

### 5-11. Iop NV SAVE

Write the reference values in the nonvolatile memory to perform "Iop compare". As this involves rewriting the reference values, do not perform this procedure except when adjusting the laser power during replacement of the OP and when replacing the IC701. Otherwise the OP check may deteriorate.

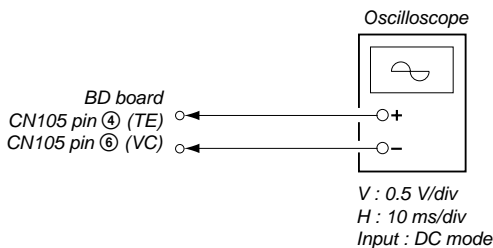
**Note:** Perform this function with the optical pick-up set at room temperature.

#### Procedure

1. Rotate the **AMS** knob to display "Iop NV Save" (C06).
2. Press the **YES** button and display "Iop [stop]" .
3. After the display changes to "Iop =xxsave?", press the **YES** button.
4. After "Complete!" is displayed momentarily, the display changes to "Iop 7.0 mW" .
5. After the display changes to "Iop=yysave?", press the **YES** button.
6. When "Complete!" is displayed, it means that Iop NV saving has been completed.

### 5-12. TRAVERSE ADJUSTMENT

#### Connection :

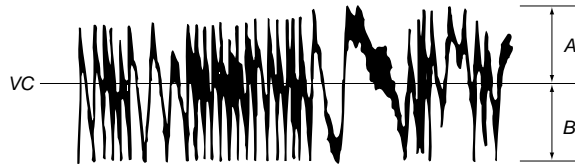


#### Adjusting Procedure :

1. Connect an oscilloscope to CN105 pin ④ (TE) and CN105 pin ⑥ (VC) of the BD board.
2. Load a test disc (MDW-74/GA1). (Refer to Note 1.)
3. Press the **▶▶** button and move the optical pick-up outside the pit.
4. Rotate the **AMS** knob and display "EF MO ADJUS" (C07).
5. Press the **YES** button and display "EFB = @ MO-R".  
(Laser power READ power/Focus servo ON/tracking servo OFF/spindle (S) servo ON)

6. Rotate the **AMS** knob so that the waveform of the oscilloscope becomes the specified value.  
(When the **AMS** knob is rotated, the @ of "EFB = @ MO-R" changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.  
(Read power traverse adjustment)

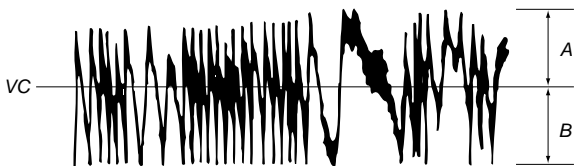
(Traverse Waveform)



Specification A = B

7. Press the **YES** button and save the result of adjustment to the non-volatile memory ("EFB = @ SAVE" will be displayed for a moment. Then "EFB = @ MO-W" will be displayed).
8. Rotate the **AMS** knob so that the waveform of the oscilloscope becomes the specified value.  
(When the **AMS** knob is rotated, the @ of "EFB = @ MO-W" changes and the waveform changes.) In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.  
(Write power traverse adjustment)

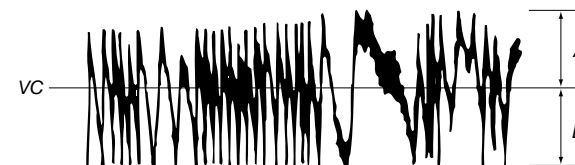
(Traverse Waveform)



Specification A = B

9. Press the **YES** button, and save the adjustment results in the non-volatile memory. ("EFB = @ SAVE" will be displayed for a moment.)
10. "EFB = @ MO-P". will be displayed.  
The optical pick-up moves to the pit area automatically and servo is imposed.
11. Rotate the **AMS** knob until the waveform of the oscilloscope moves closer to the specified value.  
In this adjustment, waveform varies at intervals of approx. 2%. Adjust the waveform so that the specified value is satisfied as much as possible.

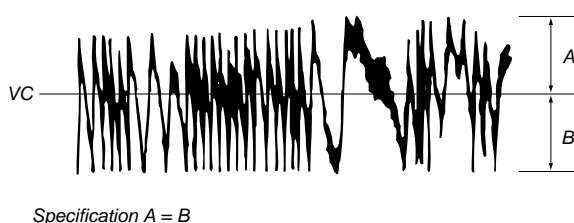
(Traverse Waveform)



Specification A = B

12. Press the **[YES]** button, and save the adjustment results in the non-volatile memory. ("EFB = **000** SAVE" will be displayed for a moment.)  
Next "EF MO ADJUS" (C07) is displayed. The disc stops rotating automatically.
13. Press the **[EJECT]** button and remove the disc.
14. Load the check disc (MD) TDYS-1.
15. Rotate **[<<AMS>>]** knob and display "EF CD ADJUS" (C08).
16. Press the **[YES]** button and display "EFB = **00** CD". Servo is imposed automatically.
17. Rotate the **[<<AMS>>]** knob so that the waveform of the oscilloscope moves closer to the specified value.  
In this adjustment, waveform varies at intervals of approx. 2%.  
Adjust the waveform so that the specified value is satisfied as much as possible.

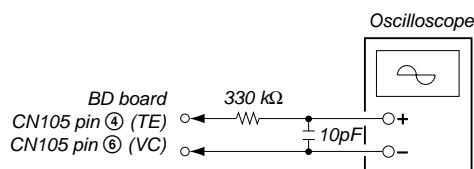
(Traverse Waveform)



18. Press the **[YES]** button, display "EFB = **00** SAVE" for a moment and save the adjustment results in the non-volatile memory. Next "EF CD ADJUS" (C08) will be displayed.
19. Press the **[EJECT]** button and remove the check disc (MD) TDYS-1.

**Note 1 :** MO reading data will be erased during if a recorded disc is used in this adjustment.

**Note 2 :** If the traverse waveform is not clear, connect the oscilloscope as shown in the following figure so that it can be seen more clearly.



### 5-13. FOCUS BIAS ADJUSTMENT

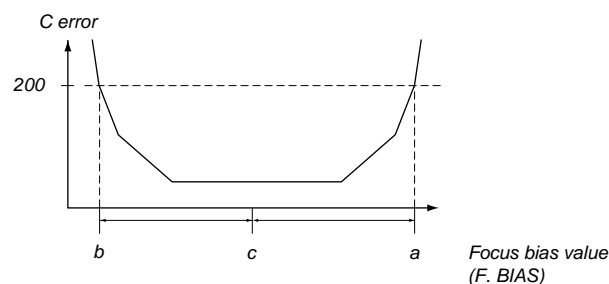
#### Adjusting Procedure :

1. Load a test disk (MDW-74/GA1).
2. Rotate the **[<<AMS>>]** knob and display "CPLAY1 MODE" (C34).
3. Press the **[YES]** button and display "CPLAY1 MID".
4. The display change to "C = **0000** AD = **00**".
5. Press the **[MENU/NO]** button.
6. Rotate the **[<<AMS>>]** knob and display "FBIAS ADJUS" (C09).
7. Press the **[YES]** button and display "**0000/00** a = **00**".  
The first four digits indicate the C error rate, the two digits after [/] indicate ADER, and the 2 digits after [a =] indicate the focus bias value.
8. Rotate the **[<<AMS>>]** knob in the clockwise direction and find the focus bias value at which the C error rate becomes 200 (Refer to Note 2).
9. Press the **[YES]** button and display "**0000/00** b = **00**".
10. Rotate the **[<<AMS>>]** knob in the counterclockwise direction and find the focus bias value at which the C error rate becomes 200.

11. Press the **[YES]** button and display "**0000/00** c = **00**".
12. Check that the C error rate is below 50 and ADER is 2. Then press the **[YES]** button.
13. If the "(**00**)" in "**00** - **00** - **00** (**00**)" is above 20, press the **[YES]** button.  
If below 20, press the **[MENU/NO]** button and repeat the adjustment from step 2.
14. Press the **[EJECT]** button to remove the test disc.

**Note 1 :** The relation between the C error and focus bias is as shown in the following figure. Find points a and b in the following figure using the above adjustment. The focal point position C is automatically calculated from points a and b.

**Note 2 :** As the C error rate changes, perform the adjustment using the average value.



### 5-14. ERROR RATE CHECK

#### 5-14-1. CD Error Rate Check

##### Checking Procedure :

1. Load a check disc (MD) TDYS-1.
2. Rotate the **[<<AMS>>]** knob and display "CPLAY1 MODE" (C34).
3. Press the **[YES]** button twice and display "CPLAY1 MID".
4. The display changes to "C = **0000** AD = **00**".
5. Check that the C error rate is below 50.
6. Press the **[MENU/NO]** button, stop playback, press the **[EJECT]** button, and remove the test disc.

#### 5-14-2. MO Error Rate Check

##### Checking Procedure :

1. Load a continuously recorded test disc (MDW-74/GA1).  
(Refer to "5-5. Using the Continuously Recorded Disc".)
2. Rotate the **[<<AMS>>]** knob and display "CPLAY1 MODE" (C34).
3. Press the **[YES]** button and display "CPLAY1 MID".
4. The display changes to "C = **0000** AD = **00**".
5. If the C error rate is below 50, check that ADER is 2.
6. Press the **[MENU/NO]** button, stop playback, press the **[EJECT]** button, and remove the test disc.

### 5-15. FOCUS BIAS CHECK

Change the focus bias and check the focus tolerance amount.

#### Checking Procedure :

1. Load a continuously recorded test disc (MDW-74/GA1).  
(Refer to "5-5. Using the Continuously Recorded Disc".)
2. Rotate the **◀◀ AMS ▶▶** knob and display "CPLAY1 MODE" (C34).
3. Press the **[YES]** button twice and display "CPLAY1 MID".
4. The display change to "C = 0000 AD = 00".
5. Press the **[MENU/NO]** button.
6. Rotate the **◀◀ AMS ▶▶** knob and display "FBIAS CHECK" (C16).
7. Press the **[YES]** button and display "0000/00 c = 00".  
The first four digits indicate the C error rate, the two digits after [/] indicate ADR, and the 2 digits after [c =] indicate the focus bias value.  
Check that the C error is below 50 and ADER is below 2.
8. Press the **[YES]** button and display "0000/00 b = 00".  
Check that the C error is below 100 and ADER is below 2.
9. Press the **[YES]** button and display "0000/00 a = 00".  
Check that the C error is below 100 and ADER is below 2.
10. Press the **[MENU/NO]** button, next press the **[EJECT]** button, and remove the continuously recorded disc.

**Note 1 :** If the C error and ADER are above other than the specified value at points a (step 9. in the above) or b (step 8. in the above), the focus bias adjustment may not have been carried out properly. Adjust perform the beginning again.

### 5-16. AUTO GAIN CONTROL OUTPUT LEVEL ADJUSTMENT

Be sure to perform this adjustment when the Optical pick-up is replaced.

If the adjustment results becomes "Adjust NG!", the Optical pick-up may be faulty or the servo system circuits may be abnormal.

#### 5-16-1. CD Auto Gain Control Output Level Adjustment

##### Adjusting Procedure :

1. Insert the check disc (MD) TDYS-1.
2. Rotate the **◀◀ AMS ▶▶** knob to display "AG Set (CD)" (C11).
3. When the **[YES]** button is pressed, the adjustment will be performed automatically.  
"Complete!" will then be displayed momentarily when the value is recorded in the non-volatile memory, after which the display changes to "AG Set (CD)" (C11).
4. Press the **[EJECT]** button to remove the disc.

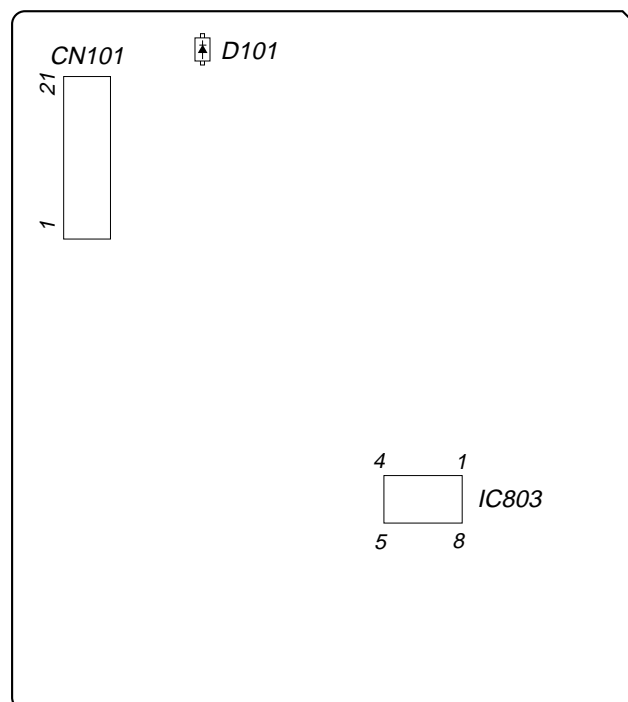
#### 5-16-2. MO Auto Gain Control Output Level Adjustment

##### Adjusting Procedure :

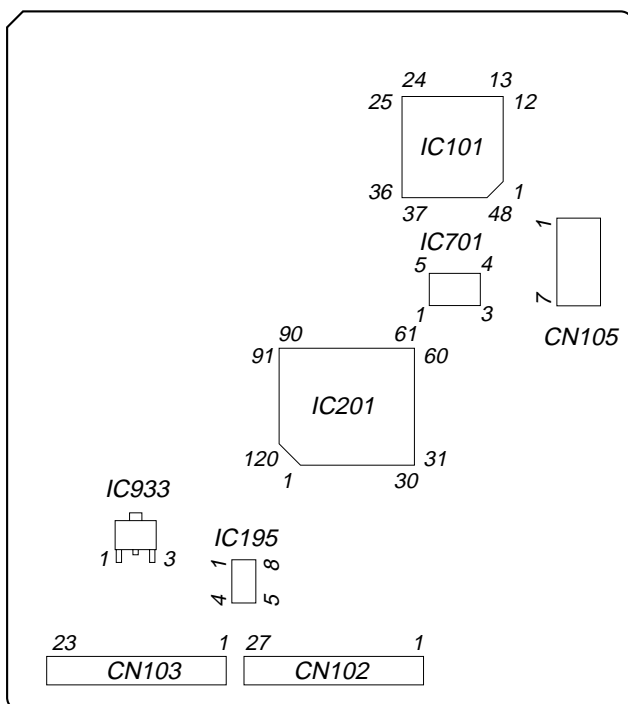
1. Insert the reference disc (MDW-74/GA-1) for recording.
2. Rotate the **◀◀ AMS ▶▶** knob to display "AG Set (MO)" (C10).
3. When the **[YES]** button is pressed, the adjustment will be performed automatically.  
"Complete!" will then be displayed momentarily when the value is recorded in the non-volatile memory, after which the display changes to "AG Set (MO)" (C10).
4. Press the **[EJECT]** button to remove the disc.

### 5-17. ADJUSTING POINTS AND CONNECTING POINTS

#### [BD BOARD] (SIDE A)



#### [BD BOARD] (SIDE B)



**NOTE:** It is useful to use the jig. for checking the waveform. (Refer to Servicing Note on page 6.)



SECTION 6  
DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING  
BOARDS AND SCHEMATIC DIAGRAMS.  
(In addition to this, the necessary note is printed  
in each block.)

For schematic diagrams.

Note:

- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF}$ :  $\mu\text{F}$  50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $1/4\text{ W}$  or less unless otherwise specified.
- $\triangle$  : internal component.
- $\square$  : panel designation.

Note:

The components identified by mark  $\triangle$  or dotted line with mark  $\triangle$  are critical for safety.  
Replace only with part number specified.

- $\text{---}$  : B+ Line.
- $\text{---}$  : B- Line.
- $\text{---}$  : adjustment for repair.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.  
no mark : STOP  
( ) : PLAY  
< > : REC  
\* : Impossible to measure
- Voltages are taken with a VOM (Input impedance 10 M $\Omega$ ).  
Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope.  
Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.  
 $\text{---}$  : PB  
 $\text{---}$  : REC  
 $\text{---}$  : REC (DIGITAL IN)  
 $\text{---}$  : PLAY (DIGITAL OUT)
- Abbreviation  
SP : Singapore model  
RU : Russian model

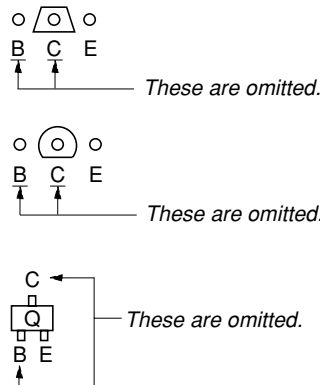
For printed wiring boards.

Note:

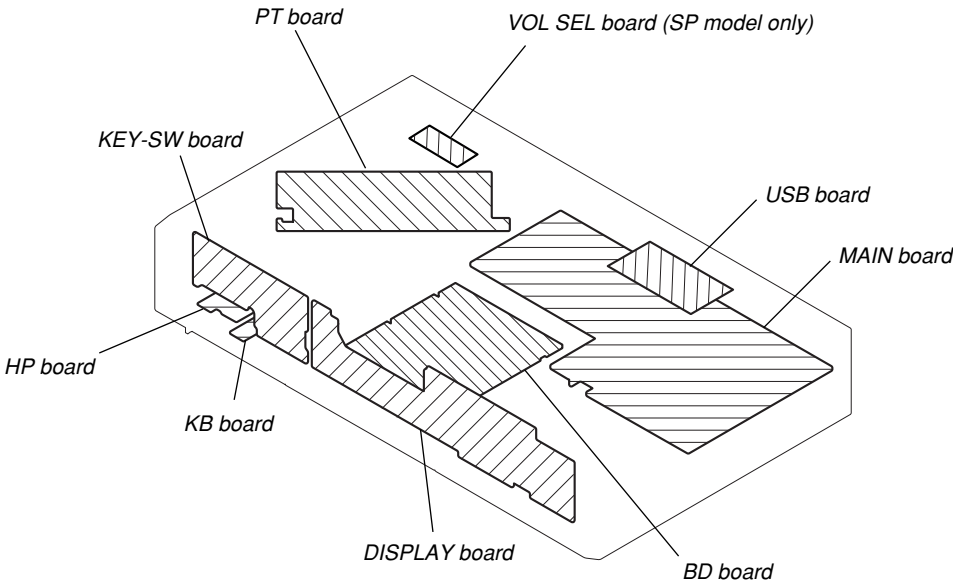
- $\text{---}$  : parts extracted from the component side.
- $\text{---}$  : parts extracted from the conductor side.
- $\circ$  : Through hole.
- $\text{---}$  : Pattern from the side which enables seeing.  
(The other layers' patterns are not indicated.)

Caution:

Pattern face side: Parts on the pattern face side seen from the (Side B) pattern face are indicated.  
Parts face side: Parts on the parts face side seen from the (Side A) parts face are indicated.

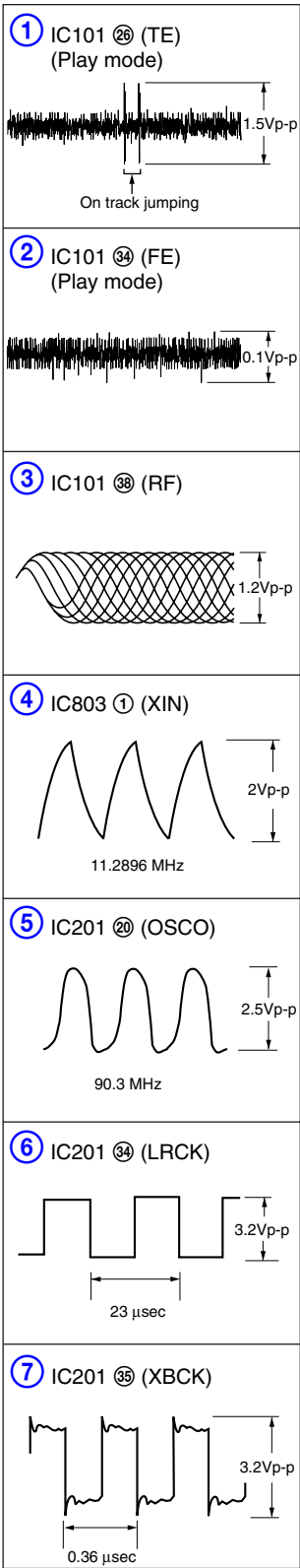


6-1. CIRCUIT BOARDS LOCATION

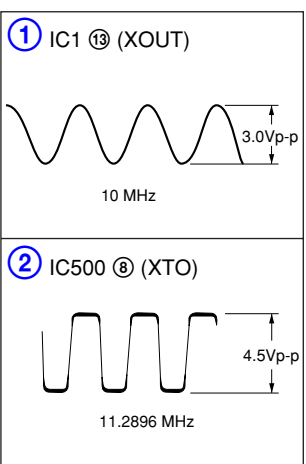


• WAVEFORMS

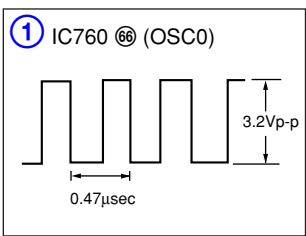
– BD Board –



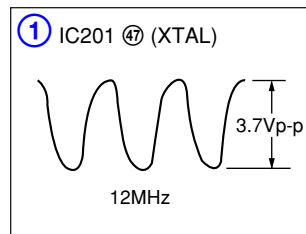
– MAIN Board –



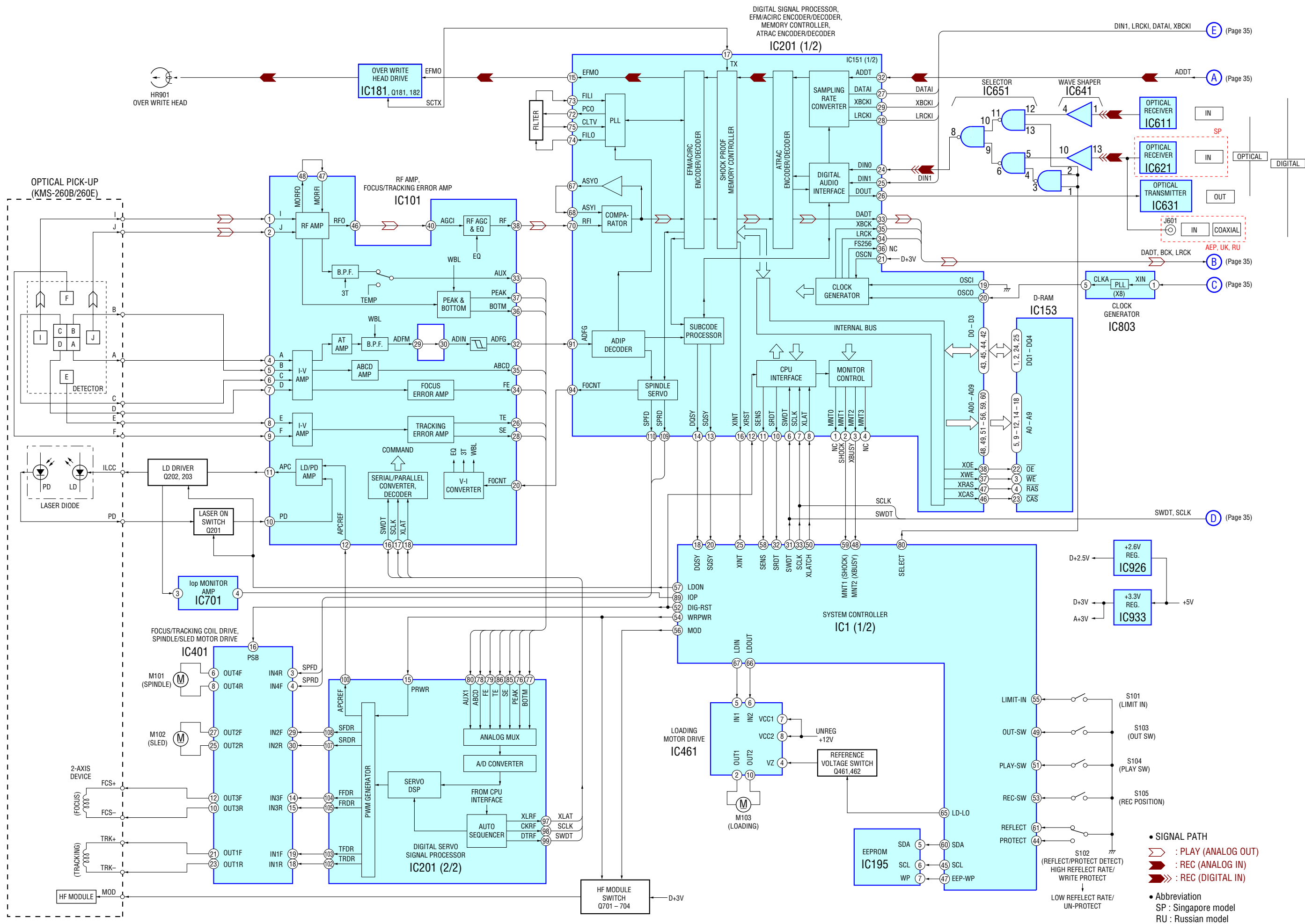
– DISPLAY Board –



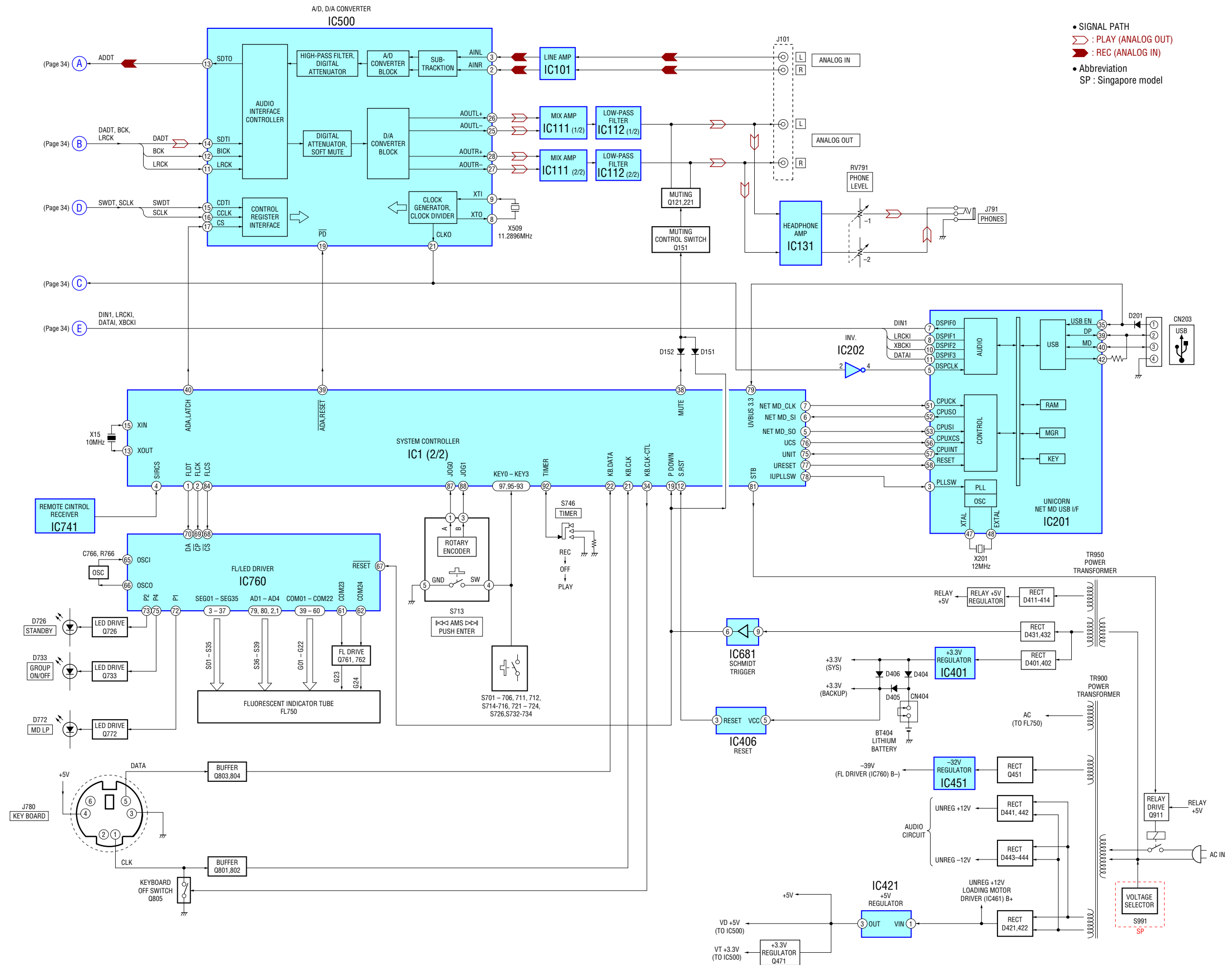
– USB Board –

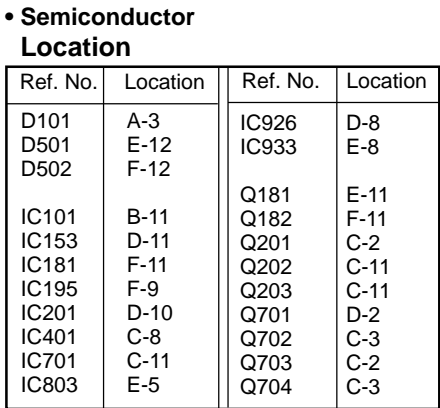


6-2. BLOCK DIAGRAMS – BD SECTION –



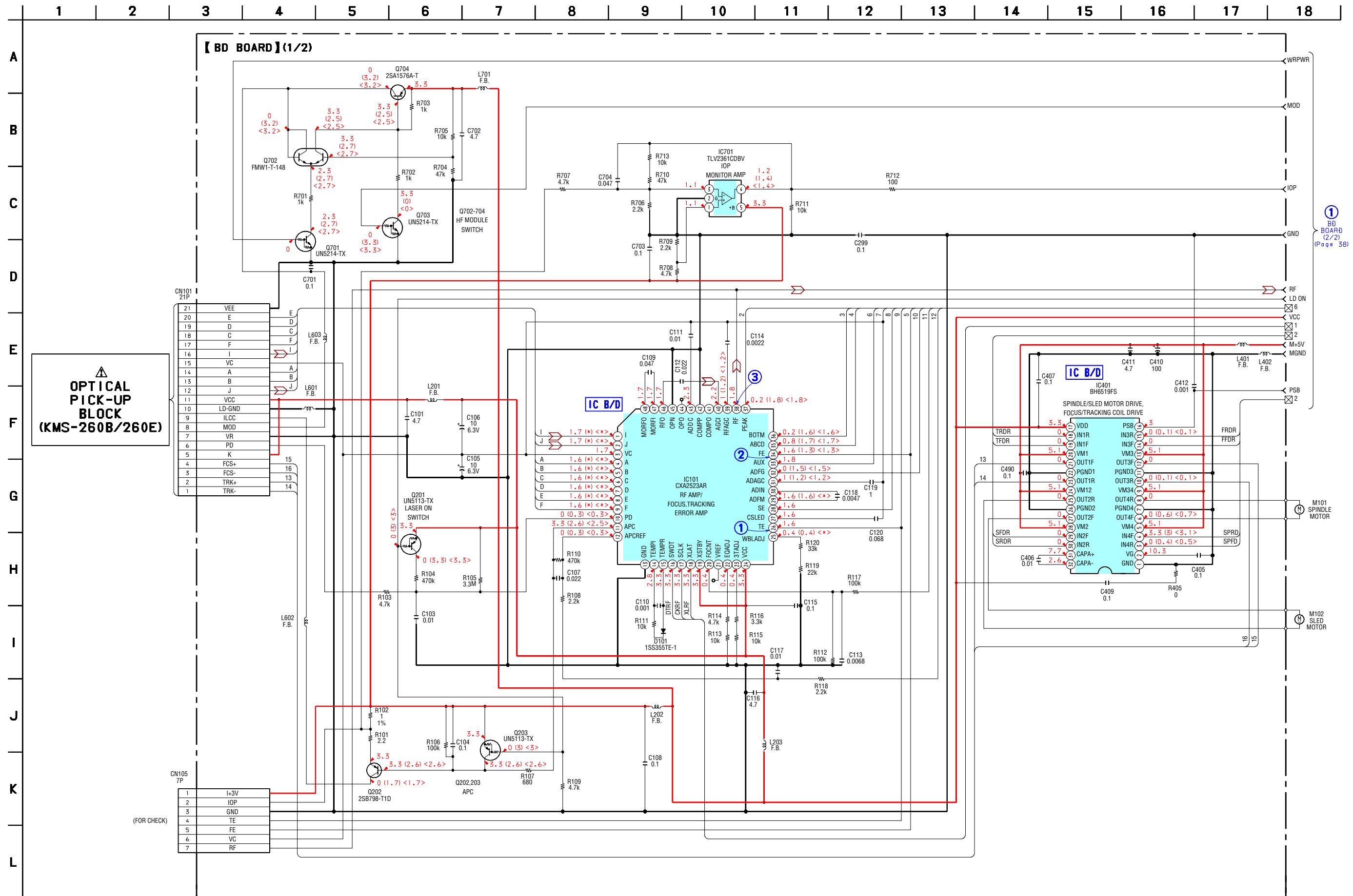
**– MAIN SECTION –**





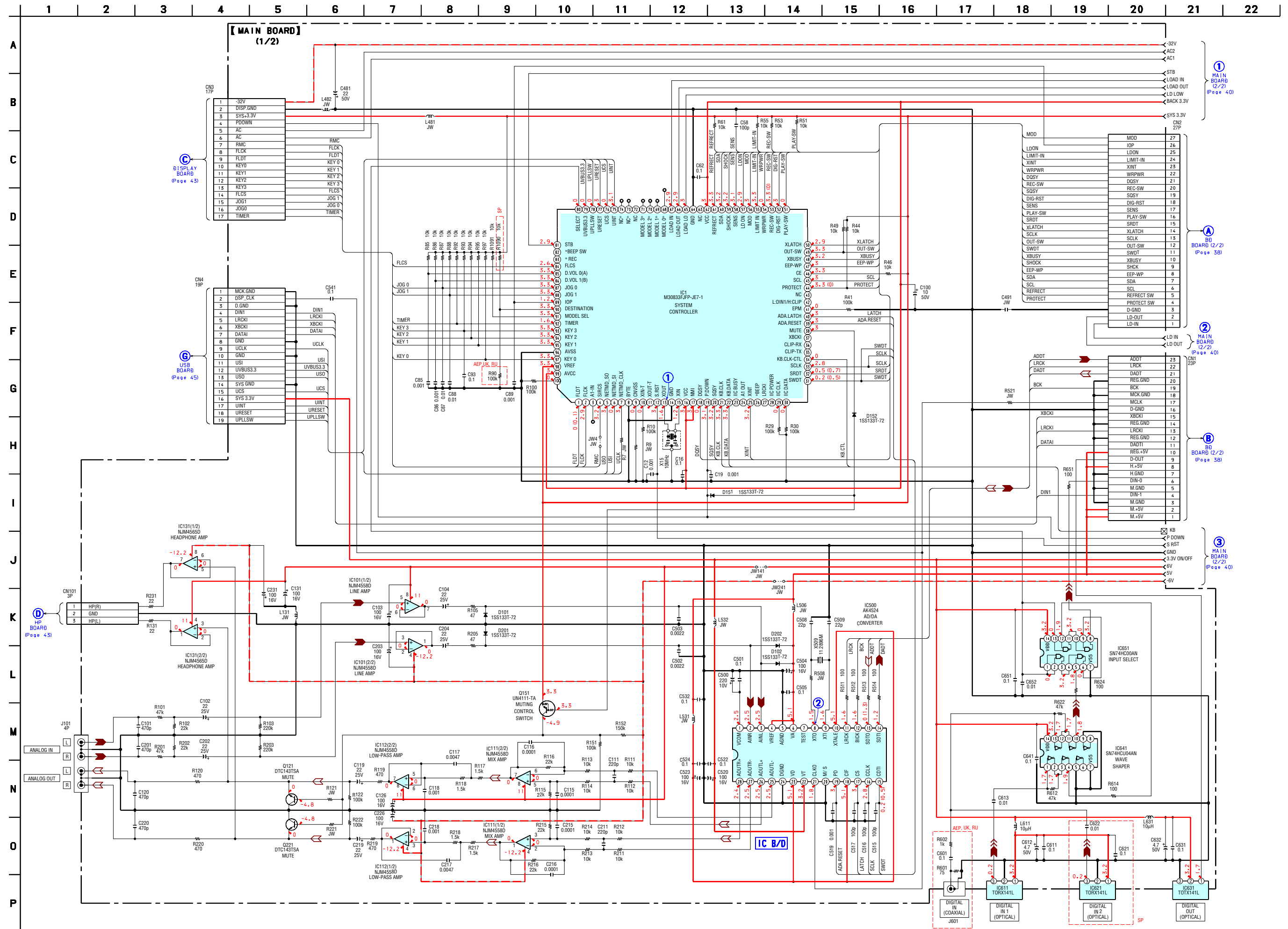


#### 6-4. SCHEMATIC DIAGRAM – BD SECTION (1/2) – • See page 46 for IC Pin Functions.



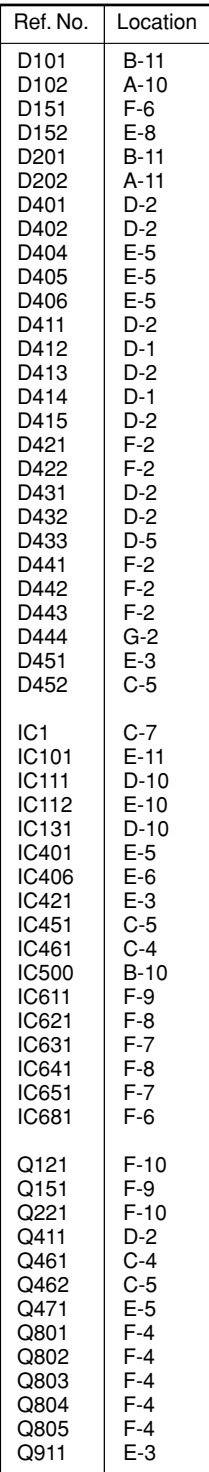


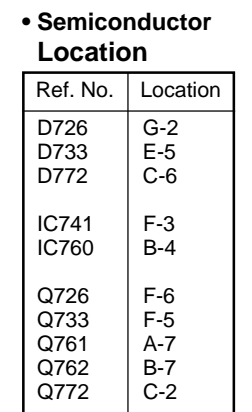
**6-6. SCHEMATIC DIAGRAM – MAIN SECTION (1/2) – • See page 49 for IC Pin Functions.**





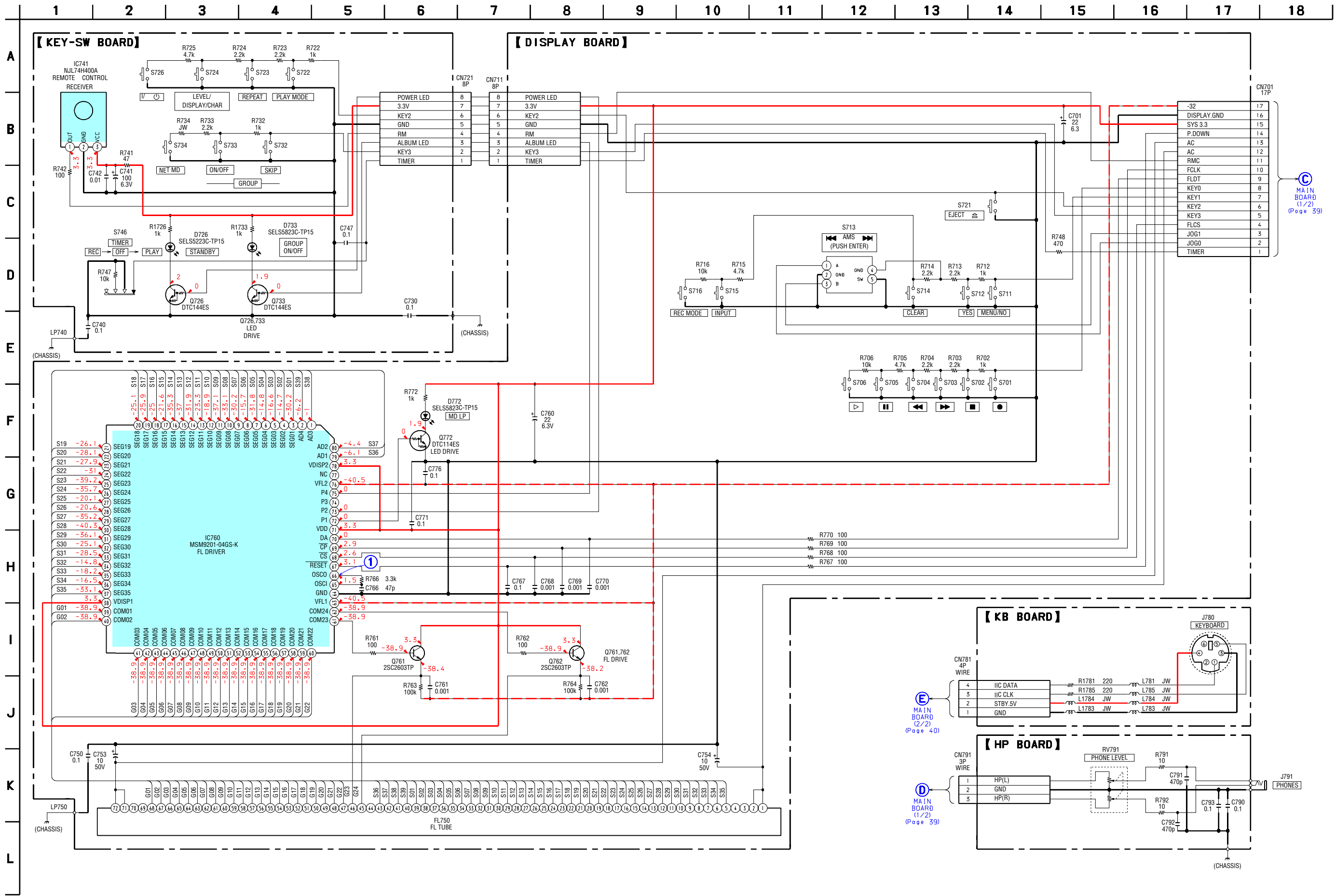




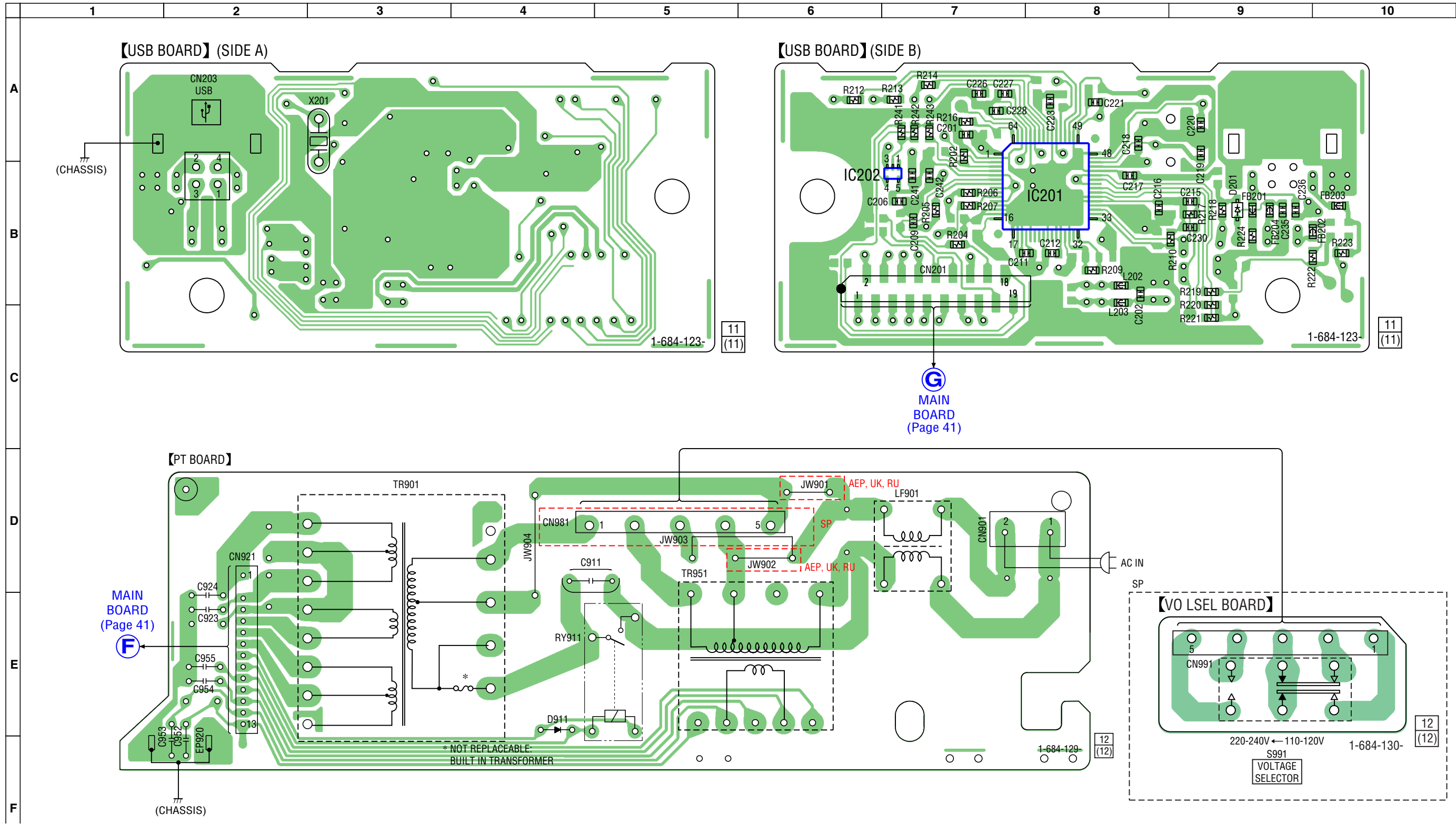




6-10. SCHEMATIC DIAGRAM – DISPLAY SECTION –



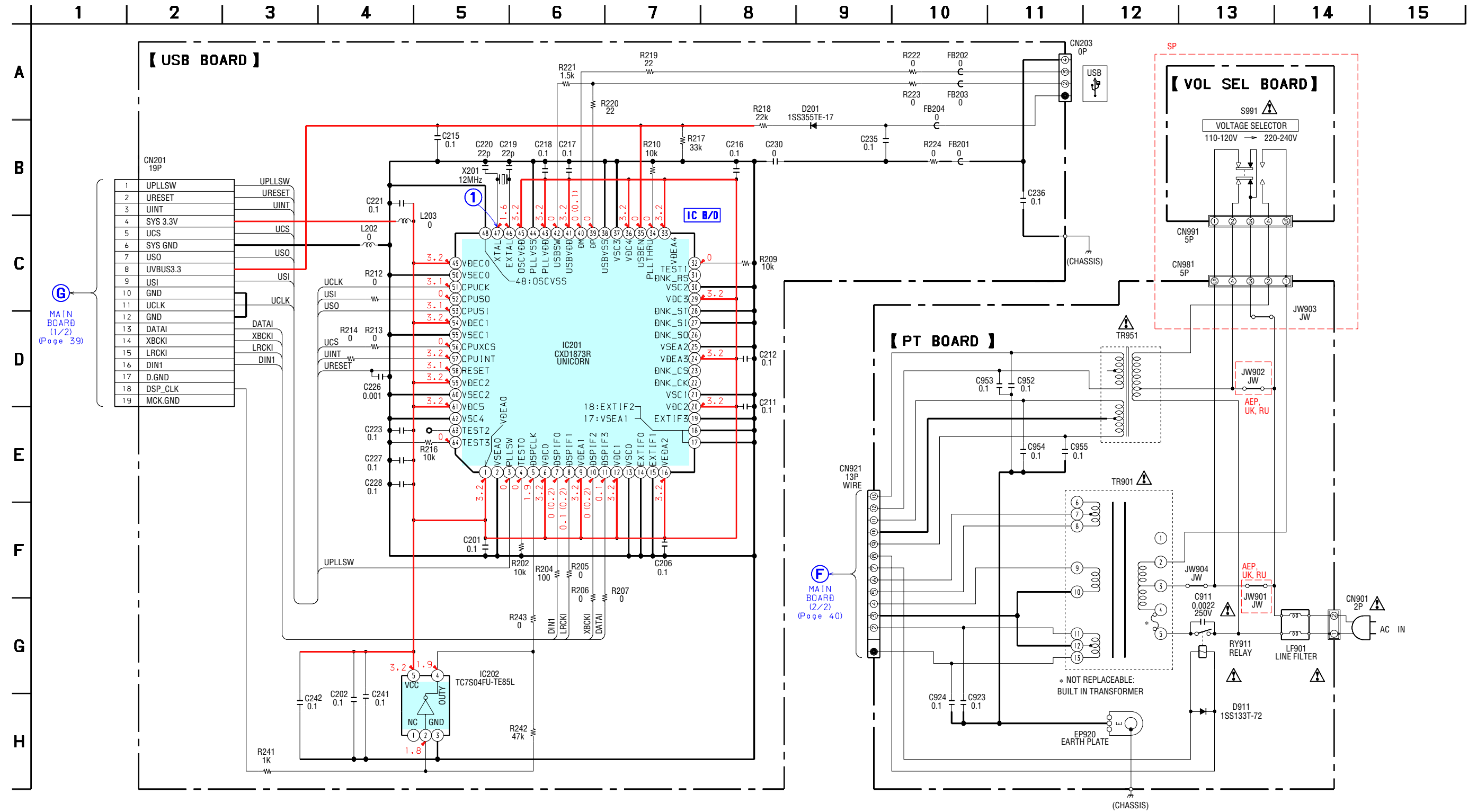
6-11. PRINTED WIRING BOARD – USB/POWER SECTION – • See page 33 for Circuit Board Location.



• Semiconductor Location

| Ref. No. | Location |
|----------|----------|
| D201     | B-9      |
| D911     | E-4      |
| IC201    | B-8      |
| IC202    | B-7      |

6-12. SCHEMATIC DIAGRAM – USB/POWER SECTION –



6-13. IC PIN FUNCTION DESCRIPTION

• IC101 CXA2523AR RF Amplifier (BD BOARD)

| Pin No. | Pin Name | I/O | Description  |
|---------|----------|-----|--|
| 1       | I        | I   | I-V converted RF signal I input  |
| 2       | J        | I   | I-V converted RF signal J input  |
| 3       | VC       | O   | Middle point voltage generation output                                       |
| 4 - 9   | A to F   | I   | Signal input from the optical pick-up detector                               |
| 10      | PD       | I   | Light amount monitor input   |
| 11      | APC      | O   | Laser APC output   |
| 12      | APCREF   | I   | Reference voltage input for setting laser power                              |
| 13      | GND      | —   | Ground   |
| 14      | TEMPI    | I   | Temperature sensor connection  |
| 15      | TEMPR    | O   | Reference voltage output for the temperature sensor                          |
| 16      | SWDT     | I   | Serial data input from the CXD2664R  |
| 17      | SCLK     | I   | Serial clock input from the CXD2664R   |
| 18      | XLAT     | I   | Latch signal input from the CXD2664R “L”: Latch                              |
| 19      | XSTBY    | I   | Stand by signal input (Fixed at “H”)   |
| 20      | F0CNT    | I   | Center frequency control voltage input of BPF22, BPF3T, EQ from the CXD2664R |
| 21      | VREF     | O   | Reference voltage output (Not used)  |
| 22      | EQADJ    | I   | Center frequency setting pin for the internal circuit EQ                     |
| 23      | 3TADJ    | I   | Center frequency setting pin for the internal circuit BPF3T                  |
| 24      | Vcc      | —   | Power supply   |
| 25      | WBLADJ   | I   | Center frequency setting pin for the internal circuit BPF22                  |
| 26      | TE       | O   | Tracking error signal output to the CXD2664R                                 |
| 27      | CSLED    | —   | External capacitor connection pin for the sled error signal LPF              |
| 28      | SE       | O   | Sled error signal output to the CXD2664R                                     |
| 29      | ADFM     | O   | FM signal output of ADIP   |
| 30      | ADIN     | I   | ADIP signal comparator input ADFM is connected with AC coupling              |
| 31      | ADAGC    | —   | External capacitor connection pin for AGC of ADIP                            |
| 32      | ADFG     | O   | ADIP duplex signal output to the CXD2664R                                    |
| 33      | AUX      | O   | I3 signal/temperature signal output to the CXD2664R                          |
| 34      | FE       | O   | Focus error signal output to the CXD2664R                                    |
| 35      | ABCD     | O   | Light amount signal output to the CXD2664R                                   |
| 36      | BOTM     | O   | RF/ABCD bottom hold signal output to the CXD2664R                            |
| 37      | PEAK     | O   | RF/ABCD peak hold signal output to the CXD2664R                              |
| 38      | RF       | O   | RF equalizer output to the CXD2664R  |
| 39      | RFAGC    | —   | External capacitor connection pin for the RF AGC circuit                     |
| 40      | AGCI     | I   | The RF amplifier output is input with AC coupling                            |
| 41      | COMPO    | O   | User comparator output (Not used)  |
| 42      | COMPP    | I   | User comparator input (Fixed at “L”)   |
| 43      | ADDC     | —   | External capacitor pin for cutting the low band of the ADIP amplifier        |
| 44      | OPO      | O   | User operation amplifier output (Not used)                                   |
| 45      | OPN      | I   | User operation amplifier inversion input (Fixed at “L”)                      |
| 46      | RFO      | O   | RF amplifier output  |
| 47      | MORFI    | I   | Groove RF signal is input with AC coupling                                   |
| 48      | MORFO    | O   | Groove RF signal output  |

- Abbreviation  
APC: Auto Power Control  
AGC: Auto Gain Control

• IC201 CXD2664R Digital Signal Processor, Digital Servo Signal Processor (BD BOARD)

| Pin No. | Pin Name     | I/O   | Description  |
|---------|--------------|-------|--|
| 1       | MNT0 (FOK)   | O     | Not used (open)  |
| 2       | MNT1 (SHCK)  | O     | Track jump detection signal output to the system control                                   |
| 3       | MNT2 (XBUSY) | O     | In the state of executire command signal output  |
| 4       | MNT3 (SLOC)  | O     | Not used (open)  |
| 5       | VDC0         | —     | Power supply   |
| 6       | SWDT         | I     | Serial data input from the system control  |
| 7       | SCLK         | I     | Serial clock signal input from the system control  |
| 8       | XLAT         | I     | Serial latch signal input from the system control  |
| 9       | VSC0         | —     | Ground   |
| 10      | SRDT         | O (3) | Serial reading data output to the system control   |
| 11      | SENS         | O (3) | Internal status (SENSE) output to the system control                                       |
| 12      | XRST         | I     | Reset signal input from the system control “L”: Reset                                      |
| 13      | SQSY         | O     | Subcode Q sync (SCOR) output to the system control   |
| 14      | DQSY         | O     | Digital In U-bit CD format or MD format subcode Q sync (SCOR) output to the system control |
| 15      | RPWR         | I     | Laser power switching input from the system control “H”: Recording, “L”: Playback          |
| 16      | XINT         | O     | Interrupt status output to the system control  |
| 17      | TX           | O     | Recording data output enable input from the system control                                 |
| 18      | VDIO0        | —     | Power supply   |
| 19      | OSCI         | I     | System clock input (Fixed at “L”)  |
| 20      | OSCO         | I/O   | System clock input (Input terminal during OSCN:“H” )                                       |
| 21      | OSCN         | I     | Internal oscillating circuit control signal input  |
| 22      | VSIO0        | —     | Ground   |
| 23      | XTSL         | I     | System clock frequency setting (Fixed at “H”)  |
| 24      | DIN0         | I     | Digital audio input (Optical input)  |
| 25      | DIN1         | I     | Digital audio input (USB input)  |
| 26      | DOUT         | O     | Digital audio output (Optical output)  |
| 27      | DADTI        | I     | Serial data input  |
| 28      | LRCKI        | I     | LR clock input   |
| 29      | XBCKI        | I     | Serial data bit clock input  |
| 30      | VDC1         | —     | Power supply   |
| 31      | VSC1         | —     | Ground   |
| 32      | ADDT         | I     | Data input from the A/D converter  |
| 33      | DADT         | O     | Data output to the D/A converter   |
| 34      | LRCK         | O     | LR clock output for the A/D and D/A converter  |
| 35      | XBCK         | O     | Bit clock output to the A/D and D/A converter  |
| 36      | FS256        | O     | 256Fs clock output (Not used)  |
| 37      | XWE          | O     | Write enable signal output for DRAM  |
| 38      | XOE          | O     | Read enable output for DRAM  |
| 39      | DRVDD0       | —     | Power supply   |
| 40      | DRVSS0       | —     | Ground   |
| 41      | A11          | O     | DRAM address output (Not used) (Open)  |
| 42      | D3           | I/O   | Data input/output for DRAM   |
| 43      | D0           | I/O   |  |
| 44      | D2           | I/O   |  |
| 45      | D1           | I/O   |  |

\* O (3) for 3-state output in the column I/O

| Pin No. | Pin Name | I/O   | Description  |
|---------|----------|-------|--|
| 46      | XCAS     | O     | CAS signal output for DRAM   |
| 47      | XRAS     | O     | RAS signal output for DRAM   |
| 48      | A09      | O     | DRAM address output  |
| 49      | A08      | O     |  |
| 50      | A10      | O     | Not used (Open)  |
| 51      | A07      | O     | DRAM address output  |
| 52      | A00      | O     |  |
| 53      | A06      | O     |  |
| 54      | A01      | O     |  |
| 55      | A05      | O     |  |
| 56      | A02      | O     |  |
| 57      | VDC2     | —     | Power supply   |
| 58      | VSC2     | —     | Ground   |
| 59      | A04      | O     | DRAM address output  |
| 60      | A03      | O     | DRAM address output  |
| 61      | DRVDD1   | —     | Power supply   |
| 62      | DRVSS1   | —     | Ground   |
| 63      | TEST0    | I     | Not used (Fixed at “L”)  |
| 64      | TEST1    | I     | Not used (Fixed at “H”)  |
| 65      | TEST2    | I     | Not used (Open)  |
| 66      | AVD1     | —     | Power supply   |
| 67      | ASYO     | O     | Play back EFM duplex signal output   |
| 68      | ASYI     | I (A) | Play back EFM comparator slice level input                                   |
| 69      | BIAS     | I (A) | Play back EFM comparator bias current input                                  |
| 70      | RFI      | I (A) | Play back EFM RF signal input  |
| 71      | AVS1     | —     | Ground   |
| 72      | PCO      | O (3) | Phase comparison output for the recording/playback EFM master PLL            |
| 73      | FILI     | I (A) | Filter input for the recording/playback EFM master PLL                       |
| 74      | FILO     | O (A) | Filter output for the recording/playback EFM master PLL                      |
| 75      | CLTV     | I (A) | Internal VCO control voltage input for the recording/playback EFM master PLL |
| 76      | PEAK     | I (A) | Light amount signal peak hold input  |
| 77      | BOTM     | I (A) | Light amount signal bottom hold input  |
| 78      | ABCD     | I (A) | Light amount signal input  |
| 79      | FE       | I (A) | Focus error signal input from the CXA2523AR                                  |
| 80      | AUX1     | I (A) | Auxiliary A/D input  |
| 81      | VC       | I (A) | Middle point voltage input from the CXA2523AR                                |
| 82      | ADIO     | O (A) | Monitor output of the A/D converter input signal (Not used) (Open)           |
| 83      | ADRT     | I (A) | A/D converter operational range upper limit voltage input (Fixed at “H”)     |
| 84      | ADRB     | I (A) | A/D converter operational range lower limit voltage input (Fixed at “L”)     |
| 85      | SE       | I (A) | Sled error signal input from the CXA2523AR                                   |
| 86      | TE       | I (A) | Tracking error signal input from the CXA2523AR                               |
| 87      | AVD2     | —     | Power supply   |
| 88      | AVS2     | —     | Ground   |
| 89      | DCHG     | I (A) | Connected to +3V power supply  |
| 90      | APC      | I     | APC error signal input (Not used) (Fixed at “H”)                             |
| 91      | ADFG     | I     | ADIP duplex FM signal input from the CXA2523AR                               |

\* I (A) for analog input, O (3) for 3-state output, and O (A) for analog output in the column I/O

• Abbreviation

EFM: Eight to Fourteen Modulation

PLL : Phase Locked Loop

VCO: Voltage Controlled Oscillator

| Pin No. | Pin Name     | I/O | Description  |
|---------|--------------|-----|--|
| 92      | VDIO1        | —   | Power supply   |
| 93      | VSIO1        | —   | Ground   |
| 94      | F0CNT        | O   | Filter f0 control output to the CXA2523AR              |
| 95      | VDC3         | —   | Power supply   |
| 96      | VSC3         | —   | Ground   |
| 97      | XLRF         | O   | Control latch output to the CXA2523AR                  |
| 98      | CLRF         | O   | Control clock output to the CXA2523AR                  |
| 99      | DTRF         | O   | Control data output to the CXA2523AR                   |
| 100     | APCR         | O   | Reference PWM output for the laser APC                 |
| 101     | LDDR         | O   | PWM output for the laser digital APC (Not used) (Open) |
| 102     | TRDR         | O   | Tracking servo drive PWM output (–)                    |
| 103     | TFDR         | O   | Tracking servo drive PWM output (+)                    |
| 104     | FFDR         | O   | Focus servo drive PWM output (+)                       |
| 105     | FRDR         | O   | Focus servo drive PWM output (–)                       |
| 106     | FS4          | O   | 4Fs clock signal output (Not used) (Open)              |
| 107     | SRDR         | O   | Sled servo drive PWM output (–)                        |
| 108     | SFDR         | O   | Sled servo drive PWM output (+)                        |
| 109     | SPRD         | O   | Spindle servo drive PWM output (–)                     |
| 110     | SPFD         | O   | Spindle servo drive PWM output (+)                     |
| 111     | FGIN         | I   | Spindle CAV servo FG signal input (Fixed at “L”)       |
| 112-114 | TST1 to TST3 | I   | Test input (Fixed at “L”)                              |
| 115     | EFMO         | O   | EFM output when recording                              |
| 116     | VDIO2        | —   | Power supply   |
| 117     | VSIO2        | —   | Ground   |
| 118     | VDC4         | —   | Power supply   |
| 119     | VSC4         | —   | Ground   |
| 120     | MDDT1        | I   | MD data mode1 switching signal input (Fixed at “L”)    |

- Abbreviation  
EFM: Eight to Fourteen Modulation



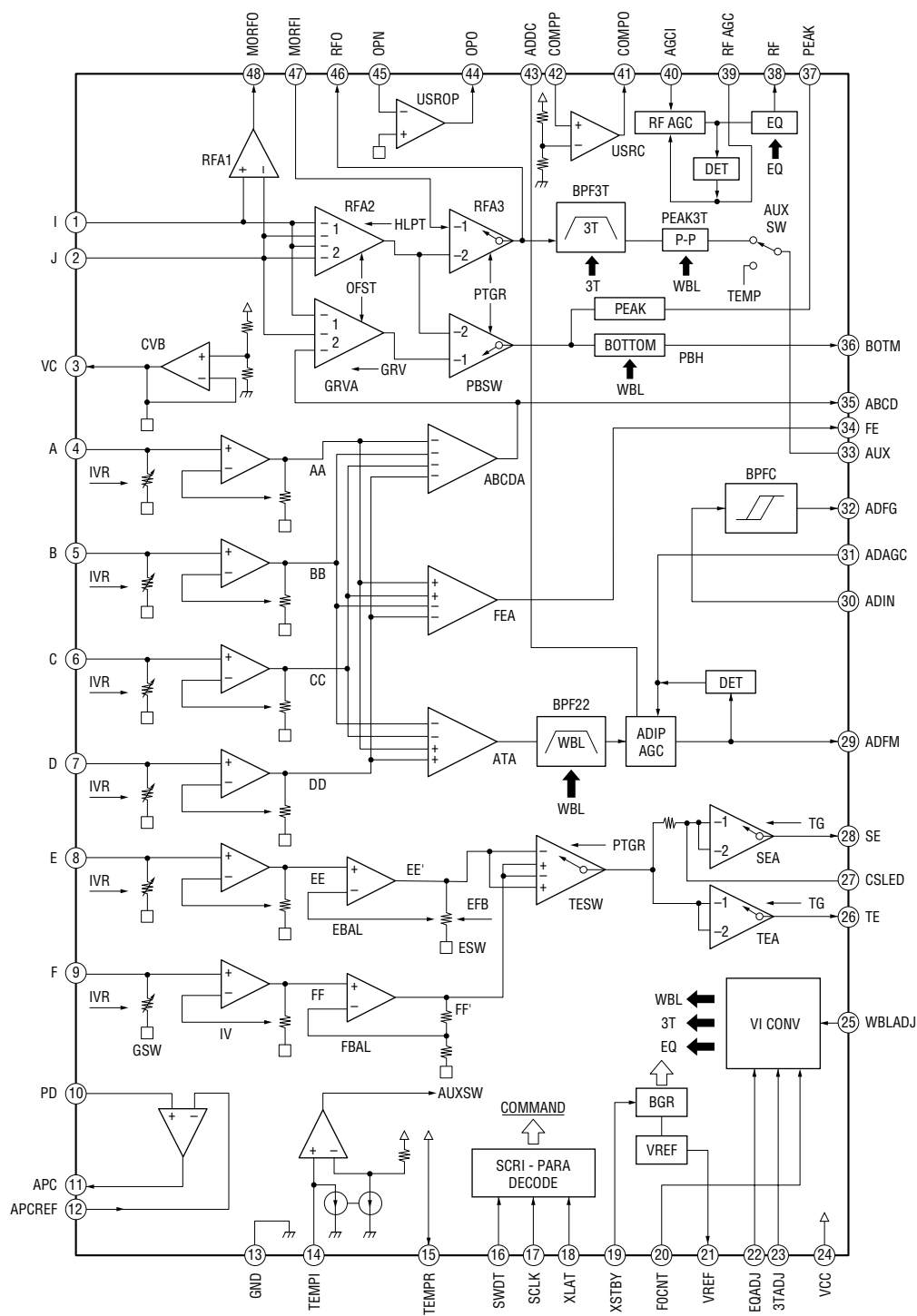
• IC1 M30833FJFP-JE7-1 SYSTEM CONTROL (MAIN BOARD)

| Pin No. | Pin Name           | I/O | Description   |
|---------|--------------------|-----|---|
| 1       | FLDT               | O   | Serial data output to the display driver  |
| 2       | FLCK               | O   | Serial clock signal output to the display driver. L: Active                               |
| 3       | A1-IN              | I   | A1 Control input (Not used) (Open)  |
| 4       | SIRCS              | I   | Remote control input  |
| 5       | NETMD_SO           | O   | Serial data output to UNICORN NETMD-USB I/F   |
| 6       | NETMD_SI           | I   | Serial data input from UNICORN NETMD-USB I/F  |
| 7       | NETMD_CLK          | O   | Clock signal output to UNICORN NETMD-USB I/F  |
| 8       | BYTE               | I   | Data bus changed input (Fixed at "L")   |
| 9       | CNVSS              | —   | Ground  |
| 10      | XIN-T              | I   | Not used (Fixed at "L")   |
| 11      | XOUT-T             | O   | Not used (Open)   |
| 12      | S.RST              | I   | System reset input  |
| 13      | XOUT               | O   | Main clock output (10MHz)   |
| 14      | GND                | —   | Ground  |
| 15      | XIN                | I   | Main clock input (10MHz)  |
| 16      | VCC                | —   | Power supply  |
| 17      | NMI                | I   | Fixed at H (Fixed at "H")   |
| 18      | DQSY               | I   | Digital in sync input (Record system)   |
| 19      | P.DOWN             | I   | Power down detection input L: Power down  |
| 20      | SQSY               | I   | ADIP (MO) sync or subcode Q (PIT) sync input from CXD2664R (Playback system)              |
| 21      | KB.CLK             | I   | Keyboard clock input  |
| 22      | KB.DATA            | I   | Keyboard data input   |
| 23      | IIC BUSY           | I   | IIC cable connect check (Not used) (Open)   |
| 24      | A1 OUT             | O   | A1 control output (Not used) (Open)   |
| 25      | XINIT              | I   | Interrupt status input from CXD2664R  |
| 26      | *BEEP              | O   | Not used (Open)   |
| 27      | LRCKI              | O   | Not used (Open)   |
| 28      | IIC POWER          | O   | Not used (Open)   |
| 29      | IIC CLK            | O   | Not used (Fixed at "L")   |
| 30      | IIC DATA           | I/O | Not used (Fixed at "L")   |
| 31      | SWDT               | O   | Writing data signal output to the serial bus  |
| 32      | SRDT               | I   | Reading data signal input from the serial bus   |
| 33      | SCLK               | O   | Clock signal output to the serial bus   |
| 34      | KB.CLK-CTRL        | O   | Keyboard clock ON/OFF signal output   |
| 35      | CLIP-TX            | O   | Not used (Open)   |
| 36      | CLIP-RX            | I   | Not used (Open)   |
| 37      | XBCKI              | O   | Not used (Open)   |
| 38      | MUTE               | O   | Line out muting output  |
| 39      | ADA.RESET          | O   | Reset signal output to the AK4524   |
| 40      | ADA. LATCH         | O   | Latch signal output to the AK4524   |
| 41      | EPN                | I   | Not used (Fixed at "L")   |
| 42      | L : DINT1/H : CLIP | O   | Not used (Open)   |
| 43      | NC                 | O   | Not used (Open)   |
| 44      | PROTECT            | I   | Recording-protection claw detection input from the protection detection switch H: Protect |
| 45      | SCL                | O   | Clock signal output to the EEP-ROM  |
| 46      | CE                 | I   | Not used (Pull-up)  |

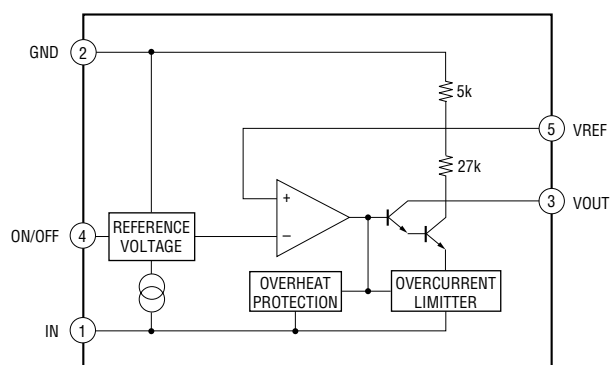
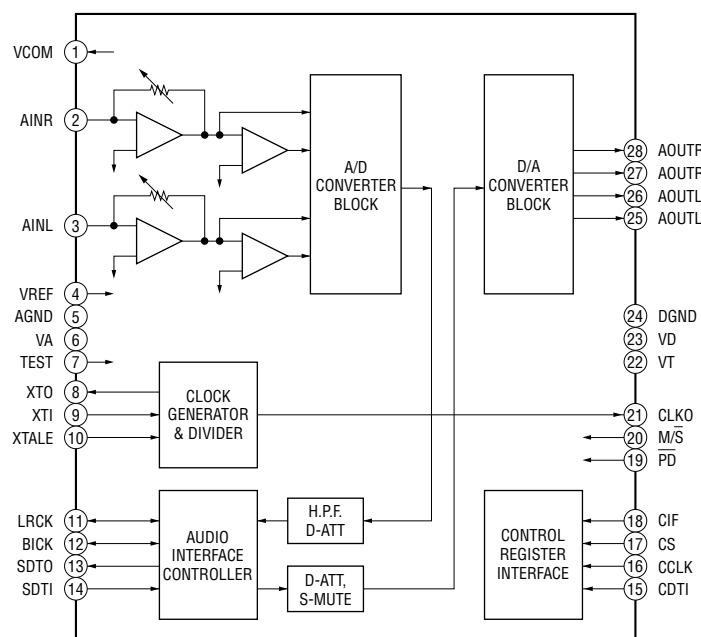
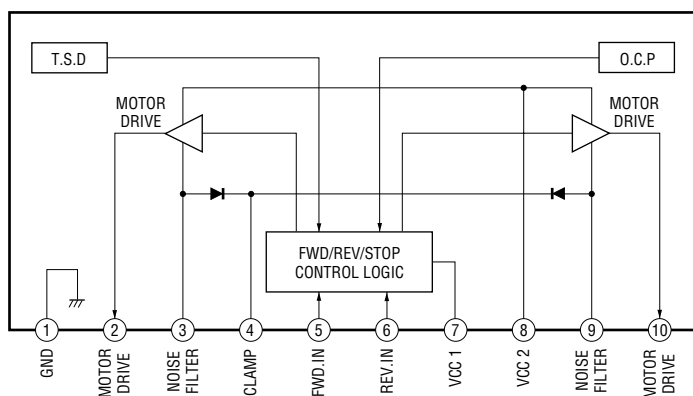
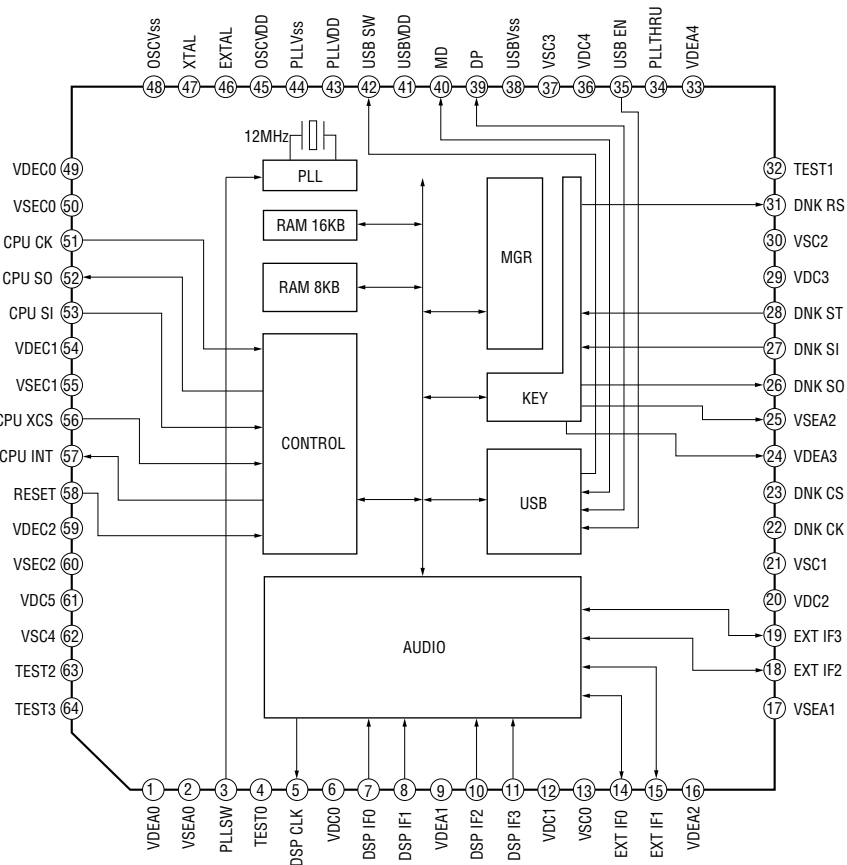
| Pin No.  | Pin Name         | I/O | Description  |
|----------|------------------|-----|--|
| 47       | EEP-WP           | O   | EEP-ROM write protect signal output L: write possibility   |
| 48       | XBUSY            | I   | In the state of executive command from the CXD2664R  |
| 49       | OUT-SW           | I   | Detection signal input from the loading out detection switch   |
| 50       | XLATCH           | O   | Latch signal output to the serial bus  |
| 51       | PLAY-SW          | I   | Detection signal input from the playback position detection switch L: PLAY                               |
| 52       | DIG-RST          | O   | Digital rest signal output to the CXD2664R and motor driver  |
| 53       | REC-SW           | I   | Detection signal input from the recording position detection switch L: REC                               |
| 54       | WR PWR           | O   | Laser power ON/OFF output  |
| 55       | LIMIT-IN         | I   | Detection input from the limit switch L: Sled limit-In H: Sled limit-Out                                 |
| 56       | MOD              | O   | Laser modulation switching signal output   |
| 57       | LDON             | O   | Laser ON/OFF control output  |
| 58       | SENS             | I   | Internal status (SENSE) input from the CXD2664R  |
| 59       | SHCK             | I   | Track jump signal input from the CXD2664R  |
| 60       | SDA              | I/O | Serial data input/output pin with the EEP-ROM  |
| 61       | REFLECT          | I   | Disk reflection rate detection input from the reflect detection switch. H: Disk with low reflection rate |
| 62       | VCC              | —   | Power supply   |
| 63       | NC               | O   | Not used (Open)  |
| 64       | GND              | —   | Ground   |
| 65       | LOAD LO          | O   | Loading motor voltage control output   |
| 66       | LOAD OUT         | O   | Loading motor control output H: eject  |
| 67       | LOAD IN          | O   | Loading motor control output H: loading  |
| 68 to 71 | MODEL SEL 0 to 3 | O   | Not used (Open)  |
| 72 to 74 | NC               | O   | Not used (Open)  |
| 75       | UNIT             | I   | Interrupt signal input from UNICORN NETMD-USB I/F  |
| 76       | UCS              | O   | Chip select signal output to UNICORN NETMD-USB I/F   |
| 77       | URESET           | O   | Reset signal output to UNICORN NETMD-USB I/F   |
| 78       | UPLLSW           | O   | PLL ON/OFF signal output to UNICORN NETMD-USB I/F  |
| 79       | UVBUS3.3         | I   | V bus voltage input from UNICORN NETMD-USB I/F   |
| 80       | SELECT           | O   | UNICORN optical input select signal output   |
| 81       | STB              | O   | Strobe signal output to the power supply circuit H: Power supply ON: L: standby                          |
| 82       | BEEP SW          | O   | Not used (Open)  |
| 83       | REC              | O   | Not used (Open)  |
| 84       | FLCS             | O   | Chip select signal output to the MSM9202   |
| 85, 86   | D.VOL0,1         | O   | Not used   |
| 87, 88   | JOG0, JOG1       | I   | Jog dial pulse input from the rotary encoder   |
| 89       | IOP              | I   | Optical Pick-up voltage (current) detect signal input  |
| 90       | DISTINATION      | I   | Model discrimination   |
| 91       | MODEL SEL        | I   | Model discrimination   |
| 92       | TIMER            | I   | Timer select signal input from timer select switch   |
| 93 to 95 | KEY3 to 1        | I   | Key input pin (A/D input)  |
| 96       | AVSS             | —   | Ground   |
| 97       | KEY0             | I   | Key input pin (A/D input)  |
| 98       | VREF             | I   | A/D reference voltage (Fixed at “H”)   |
| 99       | AVCC             | —   | Power supply   |
| 100      | NC               | I   | Not used (Fixed at “L”)  |

## 6-14. IC BLOCK DIAGRAMS

## IC101 CXA2523AR (BD BOARD)





**IC451 M5293L (MAIN BOARD)****IC500 AK4524 (MAIN BOARD)****IC461 LB1641 (MAIN BOARD)****IC201 CXD1873R (USB BOARD)**

## SECTION 7

### EXPLODED VIEWS

NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked “\*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.



## 7-1. CHASSIS SECTION-1

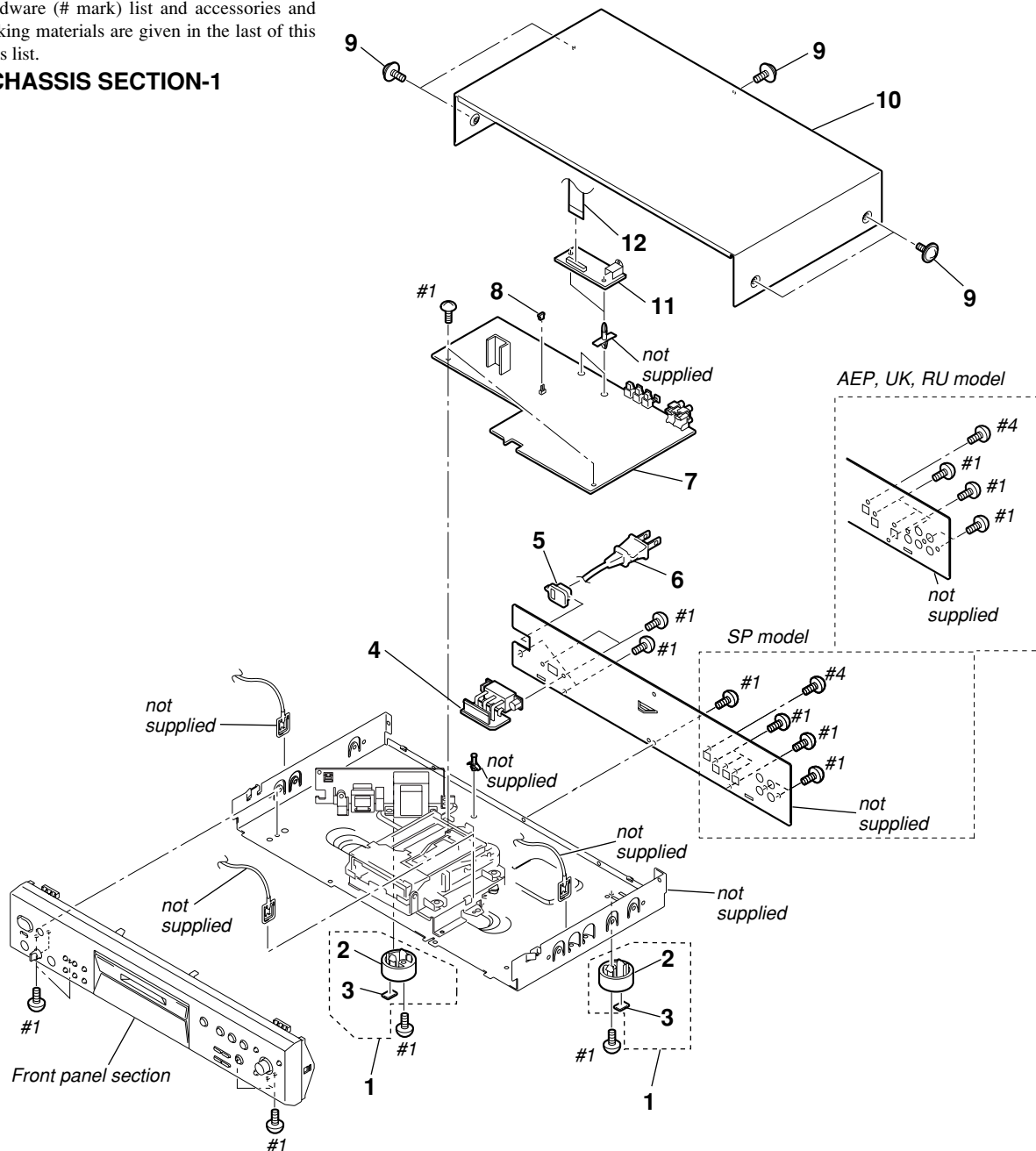
- Color indication of Appearance Parts  
Example :  
KNOB, BALANCE (WHITE)... (RED)  

↑

↑

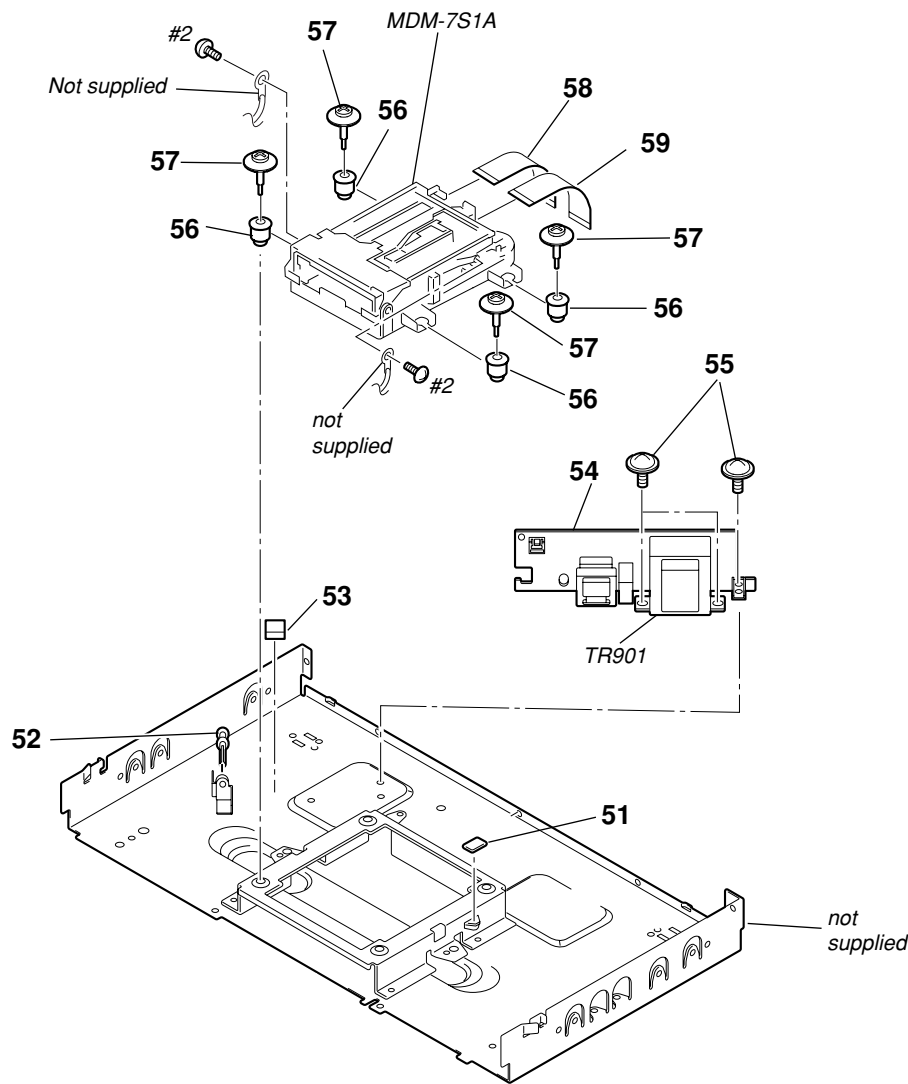
Parts color   Cabinet's color
- Abbreviation  
SP : Singapore model  
RU : Russian model

The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.



| Ref. No. | Part No.     | Description                                      | Remarks       | Ref. No. | Part No.     | Description                             | Remarks       |
|----------|--------------|--|---------------|----------|--------------|---|---------------|
| 1        | X-4953-448-1 | FOOT ASSY  |               | 9        | 4-210-291-01 | SCREW (CASE 3 TP2)...(BLACK)            |               |
| 2        | 4-232-237-01 | FOOT (DIA. 30)                                   |               | 9        | 4-210-291-11 | SCREW (CASE 3 TP2)...(SILVER)           |               |
| 3        | 4-977-358-01 | CUSHION  |               | 10       | 2-660-400-31 | CASE ...(SILVER : for Hair-line Finish) |               |
| 4        | 1-684-130-12 | VOL SEL BOARD (SP)                               |               |          |              |   | (AEP, UK, RU) |
| * 5      | 3-703-244-00 | BUSHING (2104), CORD                             |               | 10       | 4-232-149-31 | CASE ...(BLACK)                         |               |
|          |              |  |               | 10       | 4-232-580-31 | CASE ...(SILVER)                        |               |
| △ 6      | 1-777-071-63 | CORD, POWER                                      |               |          |              |   |               |
| 7        | A-4728-563-A | MAIN BOARD, COMPLETE                             | (AEP, UK, RU) | 11       | A-4728-568-A | USB BOARD, COMPLETE                     |               |
| 7        | A-4728-570-A | MAIN BOARD, COMPLETE                             | (SP)          | 12       | 1-824-046-11 | WIRE (FLAT TYPE) (19 CORE)              |               |
| * 8      | 1-569-972-21 | SOCKET, SHORT 2P                                 |               | #1       | 7-685-646-79 | SCREW +BVTP 3X8 TYPE2 N-S               |               |
| 9        | 3-363-099-11 | SCREW (CASE 3 TP2)                               |               | #4       | 7-685-871-09 | SCREW +BVTT 3X6 (S)                     |               |
|          |              | ...(SILVER : for Hair-line Finish) (AEP, UK, RU) |               |          |              |   |               |

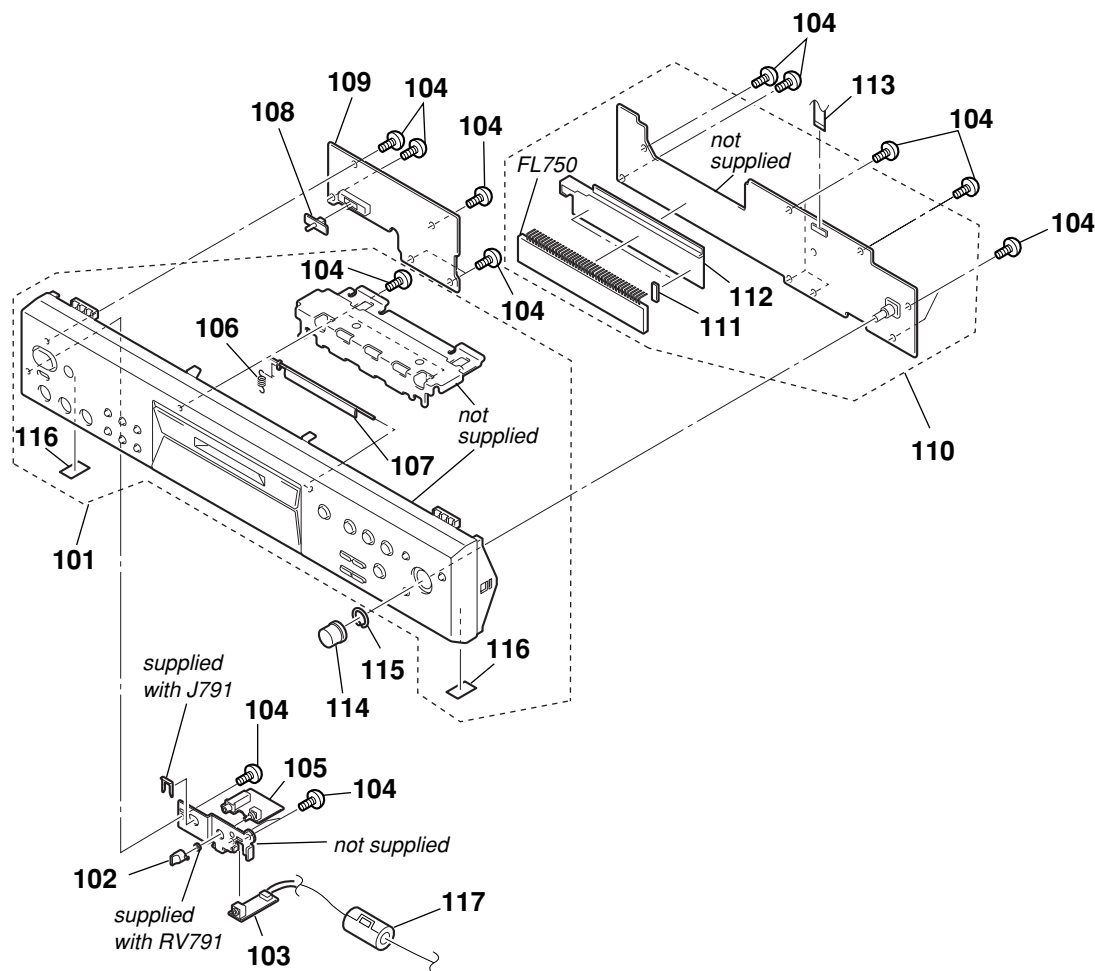
7-2. CHASSIS SECTION-2



| Ref. No. | Part No.     | Description                | Remarks | Ref. No. | Part No.     | Description                | Remarks       |
|----------|--------------|----------------------------|---------|----------|--------------|----------------------------|---------------|
| 51       | 4-977-358-01 | CUSHION                    |         | 57       | 4-228-643-11 | SCREW (+BVTTWH M3), STEP   |               |
| 52       | 3-531-576-41 | RIVET (DIA. 3), NYLON      |         | 58       | 1-824-047-11 | WIRE (FLAT TYPE) (23 CORE) |               |
| 53       | 3-937-248-01 | CUSHION (A)                |         | 59       | 1-824-048-11 | WIRE (FLAT TYPE) (27 CORE) |               |
| 54       | 1-684-129-12 | PT BOARD                   |         | △ TR901  | 1-437-339-11 | TRANSFORMER, POWER         | (AEP, UK, RU) |
| 55       | 3-703-249-01 | SCREW, S TIGHT, +PTTWH 3X6 |         | △ TR901  | 1-437-340-11 | TRANSFORMER, POWER         | (SP)          |
| 56       | 4-228-689-01 | INSULATOR                  |         | #2       | 7-685-850-04 | SCREW +BVTT 2X3 (S)        |               |

The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

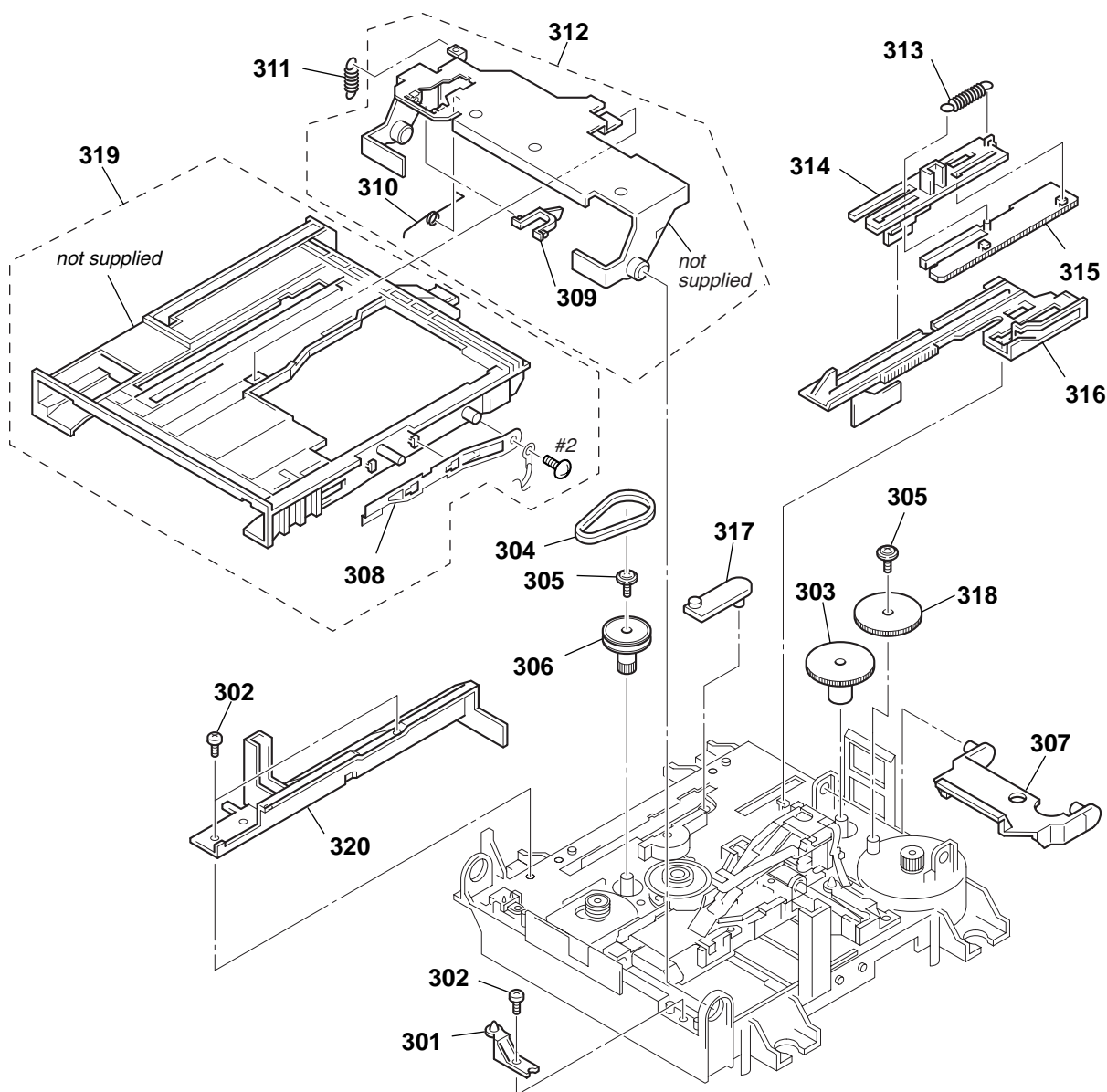
7-3. FRONT PANEL SECTION



| Ref. No. | Part No.     | Description  | Remarks | Ref. No. | Part No.     | Description  | Remarks |
|----------|--------------|--|---------|----------|--------------|--|---------|
| 101      | X-2103-028-1 | PANEL ASSY, FRONT<br>...(SILVER: Hair-line Finish) (AEP, UK, RU) |         | 109      | 1-684-126-12 | KEY SW BOARD   |         |
| 101      | X-4954-535-2 | PANEL ASSY, FRONT...(BLACK)                                      |         | 110      | A-4728-564-A | DISPLAY BOARD, COMPLETE (AEP, UK, RU)                        |         |
| 101      | X-4954-536-1 | PANEL ASSY, FRONT...(SILVER)                                     |         | 110      | A-4728-571-A | DISPLAY BOARD, COMPLETE (SP)                                 |         |
| 102      | 3-931-378-31 | KNOB (F10)...(SILVER)  |         | * 111    | 4-955-901-01 | CUSHION (FL)   |         |
| 102      | 3-931-378-51 | KNOB (F10)...(BLACK)   |         | * 112    | 4-996-686-03 | HOLDER (FL)  |         |
| 103      | 1-684-128-12 | KB BOARD   |         | 113      | 1-824-045-11 | WIRE (FLAT TYPE) (17 CORE)                                   |         |
| 104      | 4-951-620-01 | SCREW (2.6X8), +BVTP   |         | 114      | 4-231-928-01 | KNOB (AMS)...(BLACK)   |         |
| 105      | 1-684-127-12 | HP BOARD (SP)  |         | 114      | 4-231-928-11 | KNOB (AMS)...(SILVER)  |         |
| 105      | A-4728-566-A | HP BOARD, COMPLETE (AEP, UK, RU)                                 |         | 114      | 4-231-928-31 | KNOB (AMS)...(SILVER: for Hair-line Finish)<br>(AEP, UK, RU) |         |
| 106      | 4-228-630-01 | SPRING (LID), TENSION COIL                                       |         | 115      | 3-354-981-11 | SPRING (SUS), RING   |         |
| 107      | 4-228-629-21 | LID (MD)...(SILVER)  |         | 116      | 4-977-358-01 | CUSHION  |         |
| 107      | 4-228-629-81 | LID (MD)...(BLACK)   |         | 117      | 1-500-082-11 | CLAMP, SLEEVE FERRITE  |         |
| 108      | 4-971-774-01 | KNOB (TIMER)...(BLACK)   |         | FL750    | 1-517-987-11 | INDICATOR TUBE, FLUORESCENT                                  |         |
| 108      | 4-971-774-31 | KNOB (TIMER)...(SILVER)  |         |          |              |  |         |

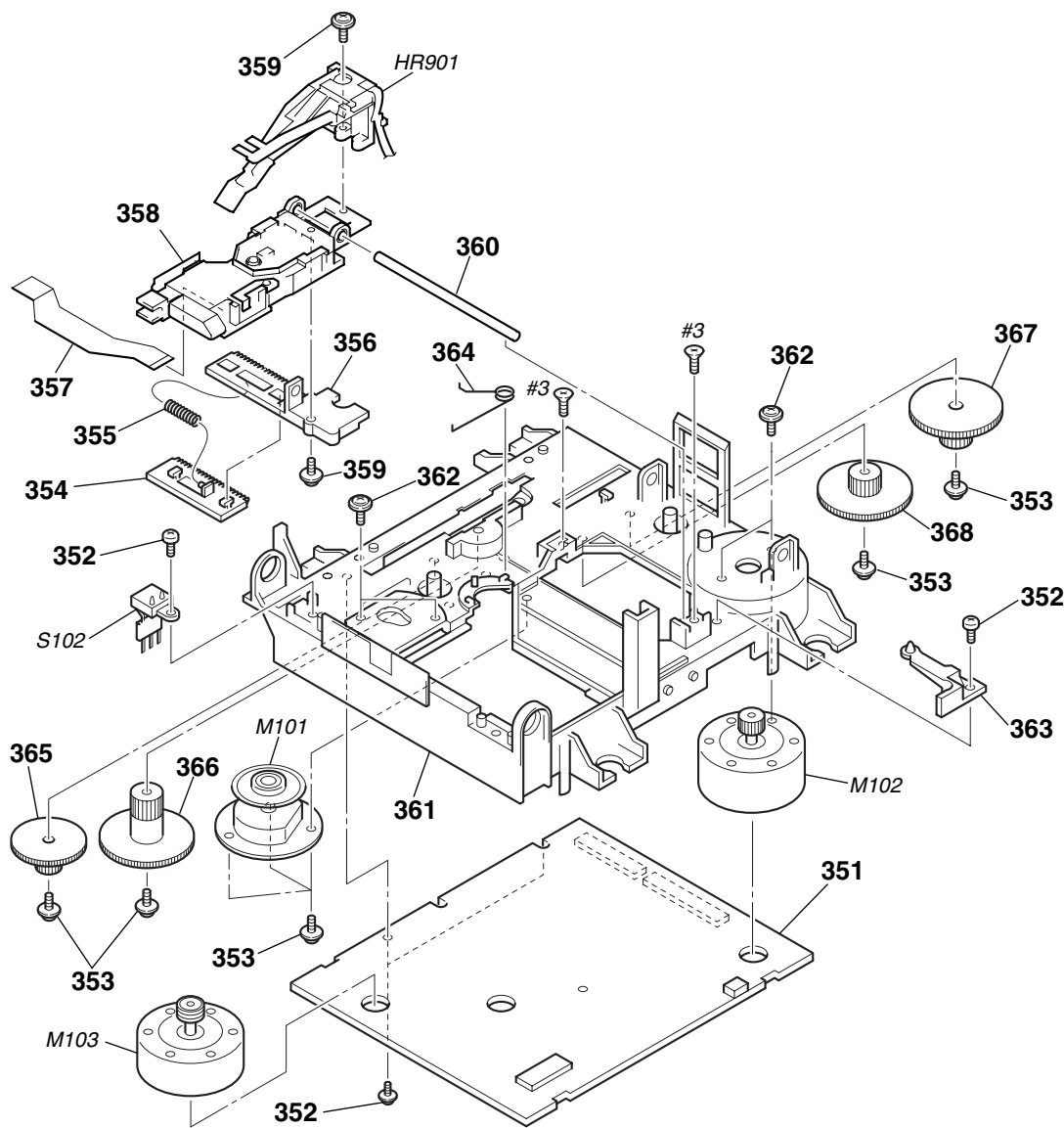


7-4. MECHANISM SECTION-1  
(MDM-7S1A)



| Ref. No. | Part No.     | Description                 | Remarks | Ref. No. | Part No.     | Description                   | Remarks |
|----------|--------------|-----------------------------|---------|----------|--------------|-------------------------------|---------|
| * 301    | 4-996-267-01 | BASE (BU-D)                 |         | 312      | A-4680-638-B | PLATE (HOLDER) ASSY, RETAINER |         |
| 302      | 4-231-319-01 | SCREW (2X6) CZN, +B (P) TRI |         | 313      | 4-227-013-01 | SPRING (EJ), TENSION          |         |
| 303      | 4-227-007-01 | GEAR (SB)                   |         | 314      | 4-226-996-01 | LIMITER (EJ)                  |         |
| 304      | 4-227-025-01 | BELT (LOADING)              |         | 315      | 4-226-995-01 | SLIDER (EJ)                   |         |
| 305      | 3-372-761-01 | SCREW (M1.7), TAPPING       |         |          |              |                               |         |
| 306      | 4-227-002-01 | GEAR, PULLEY                |         | 316      | 4-226-997-04 | SLIDER                        |         |
| 307      | 4-226-999-01 | LEVER (HEAD)                |         | 317      | 4-226-998-01 | LEVER (CHG)                   |         |
| 308      | X-4952-665-1 | SPRING (SHT) ASSY, LEAF     |         | 318      | 4-227-006-01 | GEAR (SA)                     |         |
| 309      | 4-228-923-01 | LOCK (HOLDER)               |         | 319      | A-4735-075-B | HOLDER ASSY                   |         |
| 310      | 4-229-533-02 | SPRING (STOPPER), TORSION   |         | 320      | 4-226-994-01 | GUIDE (L)                     |         |
| 311      | 4-231-118-01 | SPRING (HOLDER), TENSION    |         | #2       | 7-685-850-04 | SCREW +BVTT 2X3 (S)           |         |

7-5. MECHANISM SECTION-2  
(MDM-7S1A)



The components identified by mark Δ or dotted line with mark Δ are critical for safety.  
Replace only with part number specified.

| Ref. No. | Part No.     | Description                 | Remarks | Ref. No. | Part No.     | Description                            | Remarks |
|----------|--------------|-----------------------------|---------|----------|--------------|--|---------|
| 351      | A-4727-976-A | BD BOARD, COMPLETE          |         | 363      | 4-226-990-04 | BASE (BU-A)                            |         |
| 352      | 4-231-319-01 | SCREW (2X6) CZN, +B (P) TRI |         | 364      | 4-230-716-01 | SPRING (SPDL), TORSION                 |         |
| 353      | 3-372-761-01 | SCREW (M1.7), TAPPING       |         | 365      | 4-227-004-01 | GEAR (LC)                              |         |
| 354      | 4-226-993-01 | RACK                        |         | 366      | 4-227-005-01 | GEAR (LD)                              |         |
| 355      | 4-227-014-01 | SPRING (RACK), COMPRESSION  |         | 367      | 4-227-008-01 | GEAR (SC)                              |         |
| 356      | 4-226-992-01 | BASE, SL                    |         | 368      | 4-227-009-01 | GEAR (SD)                              |         |
| 357      | 1-678-514-11 | PWB, FLEXIBLE               |         | HR901    | 1-500-670-22 | HEAD, OVER LIGHT                       |         |
| Δ 358    | A-4672-541-A | OPTICAL PICK-UP KMS-260E    |         | M101     | A-4735-757-A | MOTOR ASSY, SPINDLE                    |         |
| 359      | 4-988-560-01 | SCREW (+P 1.7X6)            |         | M102     | A-4735-076-A | MOTOR ASSY, SLED                       |         |
| 360      | 4-996-265-01 | SHAFT, MAIN                 |         | M103     | A-4735-074-A | MOTOR ASSY, LOADING                    |         |
| 361      | 4-226-989-01 | CHASSIS                     |         | S102     | 1-771-957-11 | SWITCH, PUSH (2 KEY) (REFLECT/PROTECT) |         |
| 362      | 4-232-270-01 | SCREW (1.7X3.5), +PWH       |         | #3       | 7-685-204-19 | SCREW +KTP 2X6 TYPE2 NON-SLIT          |         |

## SECTION 8 ELECTRICAL PARTS LIST

**NOTE:**

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- CAPACITORS:  
uF:  $\mu$ F
- RESISTORS  
All resistors are in ohms.  
METAL: metal-film resistor  
METAL OXIDE: Metal Oxide-film resistor  
F: nonflammable

- COILS  
uH:  $\mu$ H
- SEMICONDUCTORS  
In each case, u:  $\mu$ , for example:  
uA...,  $\mu$ A..., uPA...,  $\mu$ PA...,  
uPB...,  $\mu$ PB..., uPC...,  $\mu$ PC...,  
uPD...,  $\mu$ PD...
- Abbreviation  
SP: Singapore model  
RU: Russian model

When indicating parts by reference number, please include the board name.

The components identified by mark  $\Delta$  or dotted line with mark  $\Delta$  are critical for safety. Replace only with part number specified.

| Ref. No. | Part No.     | Description                         | Remarks  |     | Ref. No. | Part No.     | Description  | Remarks |     |
|----------|--------------|-------------------------------------|----------|-----|----------|--------------|--------------|---------|-----|
|          | A-4727-976-A | BD MOUNTED BOARD, COMPLETE<br>***** |          |     | C241     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
|          |              | < CAPACITOR >                       |          |     | C242     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C101     | 1-117-720-11 | CERAMIC CHIP                        | 4.7uF    | 10V | C250     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C103     | 1-162-970-11 | CERAMIC CHIP                        | 0.01uF   | 10% | C251     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C104     | 1-164-156-11 | CERAMIC CHIP                        | 0.1uF    |     | C252     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C105     | 1-135-259-11 | TANTAL. CHIP                        | 10uF     | 20% | C253     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C106     | 1-135-259-11 | TANTAL. CHIP                        | 10uF     | 20% | C254     | 1-162-970-11 | CERAMIC CHIP | 0.01uF  | 10% |
|          |              |                                     |          |     | C255     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C107     | 1-164-227-11 | CERAMIC CHIP                        | 0.022uF  | 10% | C299     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C108     | 1-164-156-11 | CERAMIC CHIP                        | 0.1uF    |     | C301     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C109     | 1-165-176-11 | CERAMIC CHIP                        | 0.047uF  | 10% | C302     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C110     | 1-115-416-11 | CERAMIC CHIP                        | 0.001uF  | 5%  | C405     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C111     | 1-162-970-11 | CERAMIC CHIP                        | 0.01uF   | 10% | C406     | 1-162-970-11 | CERAMIC CHIP | 0.01uF  | 10% |
|          |              |                                     |          |     | C407     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C112     | 1-164-227-11 | CERAMIC CHIP                        | 0.022uF  | 10% | C409     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C113     | 1-162-969-11 | CERAMIC CHIP                        | 0.0068uF | 10% | C410     | 1-126-206-11 | ELECT CHIP   | 100uF   | 20% |
| C114     | 1-162-966-11 | CERAMIC CHIP                        | 0.0022uF | 10% | C411     | 1-117-720-11 | CERAMIC CHIP | 4.7uF   | 10V |
| C115     | 1-164-156-11 | CERAMIC CHIP                        | 0.1uF    |     | C412     | 1-162-964-11 | CERAMIC CHIP | 0.001uF | 10% |
| C116     | 1-117-720-11 | CERAMIC CHIP                        | 4.7uF    | 10V | C490     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
|          |              |                                     |          |     | C501     | 1-131-872-91 | CERAMIC CHIP | 1000PF  | 10% |
| C117     | 1-162-970-11 | CERAMIC CHIP                        | 0.01uF   | 10% |          |              |              |         |     |
| C118     | 1-162-968-11 | CERAMIC CHIP                        | 0.0047uF | 10% | C502     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C119     | 1-125-837-91 | CERAMIC CHIP                        | 1uF      | 10% | C503     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C120     | 1-110-563-11 | CERAMIC CHIP                        | 0.068uF  | 10% | C504     | 1-117-370-11 | CERAMIC CHIP | 10uF    | 10V |
| C121     | 1-162-970-11 | CERAMIC CHIP                        | 0.01uF   | 10% | C505     | 1-126-206-11 | ELECT CHIP   | 100uF   | 20% |
|          |              |                                     |          |     | C550     | 1-117-970-11 | ELECT CHIP   | 22uF    | 20% |
| C122     | 1-164-677-11 | CERAMIC CHIP                        | 0.033uF  | 10% |          |              |              |         |     |
| C175     | 1-164-156-11 | CERAMIC CHIP                        | 0.1uF    |     | C701     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C194     | 1-164-156-11 | CERAMIC CHIP                        | 0.1uF    |     | C702     | 1-117-720-11 | CERAMIC CHIP | 4.7uF   | 10V |
| C205     | 1-162-968-11 | CERAMIC CHIP                        | 0.0047uF | 10% | C703     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C206     | 1-126-206-11 | ELECT CHIP                          | 100uF    | 20% | C704     | 1-165-176-11 | CERAMIC CHIP | 0.047uF | 10% |
|          |              |                                     |          |     | C803     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C209     | 1-162-927-11 | CERAMIC CHIP                        | 100PF    | 5%  |          |              |              |         |     |
| C211     | 1-162-927-11 | CERAMIC CHIP                        | 100PF    | 5%  | C809     | 1-117-720-11 | CERAMIC CHIP | 4.7uF   | 10V |
| C212     | 1-162-927-11 | CERAMIC CHIP                        | 100PF    | 5%  | C812     | 1-216-864-11 | METAL CHIP   | 0       | 5%  |
| C214     | 1-162-970-11 | CERAMIC CHIP                        | 0.01uF   | 10% | C899     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C215     | 1-164-677-11 | CERAMIC CHIP                        | 0.033uF  | 10% | C901     | 1-126-206-11 | ELECT CHIP   | 100uF   | 20% |
|          |              |                                     |          |     | C902     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C216     | 1-125-889-91 | CERAMIC CHIP                        | 2.2uF    | 10% |          |              |              |         |     |
| C219     | 1-162-927-11 | CERAMIC CHIP                        | 100PF    | 5%  | C903     | 1-126-206-11 | ELECT CHIP   | 100uF   | 20% |
| C220     | 1-125-891-11 | CERAMIC CHIP                        | 0.47uF   | 10% | C904     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C221     | 1-162-970-11 | CERAMIC CHIP                        | 0.01uF   | 10% | C905     | 1-126-206-11 | ELECT CHIP   | 100uF   | 20% |
| C230     | 1-164-156-11 | CERAMIC CHIP                        | 0.1uF    |     | C907     | 1-162-970-11 | CERAMIC CHIP | 0.01uF  | 10% |
|          |              |                                     |          |     | C908     | 1-117-370-11 | CERAMIC CHIP | 10uF    | 10V |
| C231     | 1-164-156-11 | CERAMIC CHIP                        | 0.1uF    |     |          |              |              |         |     |
| C233     | 1-164-156-11 | CERAMIC CHIP                        | 0.1uF    |     | C909     | 1-104-852-11 | TANTAL. CHIP | 22uF    | 20% |
| C234     | 1-164-156-11 | CERAMIC CHIP                        | 0.1uF    |     | C998     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C235     | 1-164-156-11 | CERAMIC CHIP                        | 0.1uF    |     | C999     | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |
| C240     | 1-164-156-11 | CERAMIC CHIP                        | 0.1uF    |     | C1102    | 1-164-156-11 | CERAMIC CHIP | 0.1uF   | 25V |

BD

| Ref. No.       | Part No.       | Description                     | Remarks | Ref. No. | Part No.     | Description | Remarks         |
|----------------|----------------|---------------------------------|---------|----------|--------------|-------------|-----------------|
| < CONNECTOR >  |                |                                 |         | R107     | 1-216-819-11 | METAL CHIP  | 680 5% 1/16W    |
| CN101          | 1-766-833-21   | CONNECTOR, FFC/FPC (ZIF) 21P    |         | R108     | 1-216-825-11 | METAL CHIP  | 2.2K 5% 1/16W   |
| CN102          | 1-784-835-21   | CONNECTOR, FFC(LIF(NON-ZIF))27P |         | R109     | 1-216-829-11 | METAL CHIP  | 4.7K 5% 1/16W   |
| CN103          | 1-784-834-21   | CONNECTOR, FFC(LIF(NON-ZIF))23P |         | R110     | 1-216-853-11 | METAL CHIP  | 470K 5% 1/16W   |
| * CN104        | 1-580-055-21   | PIN, CONNECTOR (SMD) 2P         |         | R111     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
| CN105          | 1-784-859-21   | CONNECTOR, FFC(LIF(NON-ZIF))7P  |         | R112     | 1-216-845-11 | METAL CHIP  | 100K 5% 1/16W   |
| < DIODE >      |                |                                 |         | R113     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
| D101           | 8-719-988-61   | DIODE 1SS355TE-17               |         | R114     | 1-216-829-11 | METAL CHIP  | 4.7K 5% 1/16W   |
| D501           | 8-719-080-81   | DIODE FS1J6                     |         | R115     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
| D502           | 8-719-080-81   | DIODE FS1J6                     |         | R116     | 1-216-827-11 | METAL CHIP  | 3.3K 5% 1/16W   |
| < IC >         |                |                                 |         | R117     | 1-216-845-11 | METAL CHIP  | 100K 5% 1/16W   |
| IC101          | 8-752-080-95   | IC CXA2523AR                    |         | R118     | 1-216-825-11 | METAL CHIP  | 2.2K 5% 1/16W   |
| IC153          | 8-759-671-27   | IC MSM51V4400E-70TS-K           |         | R119     | 1-216-837-11 | METAL CHIP  | 22K 5% 1/16W    |
| IC181          | 8-759-481-17   | IC MC74ACT08DTR2                |         | R120     | 1-216-839-11 | METAL CHIP  | 33K 5% 1/16W    |
| IC195          | (not supplied) | IC BR24C16F-E2                  |         | R121     | 1-216-825-11 | METAL CHIP  | 2.2K 5% 1/16W   |
| IC201          | 8-752-414-89   | IC CXD2664R                     |         | R122     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
| IC401          | 8-759-836-79   | IC BH6519FS-E2                  |         | R201     | 1-216-815-11 | METAL CHIP  | 330 5% 1/16W    |
| IC701          | 8-759-473-51   | IC TLV2361CDBV                  |         | R202     | 1-216-819-11 | METAL CHIP  | 680 5% 1/16W    |
| IC803          | 6-701-793-01   | IC CY24115-2SCT                 |         | R203     | 1-216-809-11 | METAL CHIP  | 100 5% 1/16W    |
| IC926          | 8-759-835-63   | IC NJM2391DL1-26(Te1)           |         | R205     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
| IC933          | 8-759-460-72   | IC BA033FP-E2                   |         | R206     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
| < COIL >       |                |                                 |         | R207     | 1-216-811-11 | METAL CHIP  | 150 5% 1/16W    |
| L8             | 1-414-760-21   | FERRITE 0uH                     |         | R208     | 1-216-821-11 | METAL CHIP  | 1K 5% 1/16W     |
| L10            | 1-469-981-21   | FERRITE 0uH                     |         | R209     | 1-216-815-11 | METAL CHIP  | 330 5% 1/16W    |
| L122           | 1-414-760-21   | FERRITE 0uH                     |         | R210     | 1-216-839-11 | METAL CHIP  | 33K 5% 1/16W    |
| L201           | 1-414-760-21   | FERRITE 0uH                     |         | R211     | 1-216-857-11 | METAL CHIP  | 1M 5% 1/16W     |
| L202           | 1-469-981-21   | FERRITE 0uH                     |         | R212     | 1-216-851-11 | METAL CHIP  | 330K 5% 1/16W   |
| L203           | 1-414-760-21   | FERRITE 0uH                     |         | R214     | 1-216-845-11 | METAL CHIP  | 100K 5% 1/16W   |
| L401           | 1-400-050-11   | FERRITE 0uH                     |         | R216     | 1-216-864-11 | METAL CHIP  | 0 5% 1/16W      |
| L402           | 1-400-050-11   | FERRITE 0uH                     |         | R217     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
| L501           | 1-400-050-11   | FERRITE 0uH                     |         | R218     | 1-216-864-11 | METAL CHIP  | 0 5% 1/16W      |
| L502           | 1-400-050-11   | FERRITE 0uH                     |         | R219     | 1-216-809-11 | METAL CHIP  | 100 5% 1/16W    |
| L550           | 1-414-760-21   | FERRITE 0uH                     |         | R224     | 1-216-809-11 | METAL CHIP  | 100 5% 1/16W    |
| L601           | 1-469-981-21   | FERRITE 0uH                     |         | R225     | 1-216-809-11 | METAL CHIP  | 100 5% 1/16W    |
| L602           | 1-469-981-21   | FERRITE 0uH                     |         | R226     | 1-216-809-11 | METAL CHIP  | 100 5% 1/16W    |
| L603           | 1-414-760-21   | FERRITE 0uH                     |         | R228     | 1-216-809-11 | METAL CHIP  | 100 5% 1/16W    |
| L701           | 1-414-760-21   | FERRITE 0uH                     |         | R281     | 1-216-821-11 | METAL CHIP  | 1K 5% 1/16W     |
| L801           | 1-414-760-21   | FERRITE 0uH                     |         | R298     | 1-216-809-11 | METAL CHIP  | 100 5% 1/16W    |
| * L899         | 1-500-282-11   | FERRITE 0uH                     |         | R299     | 1-216-864-11 | METAL CHIP  | 0 5% 1/16W      |
| < TRANSISTOR > |                |                                 |         | R301     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
| Q181           | 8-729-018-75   | TRANSISTOR 2SJ278MY             |         | R302     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
| Q182           | 8-729-017-65   | TRANSISTOR 2SK1764KY            |         | R303     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
| Q201           | 8-729-403-35   | TRANSISTOR UN5113               |         | R405     | 1-216-864-11 | METAL CHIP  | 0 5% 1/16W      |
| Q202           | 8-729-101-07   | TRANSISTOR 2SB798-DL            |         | R501     | 1-220-942-11 | METAL CHIP  | 3.3 1% 1/4      |
| Q203           | 8-729-403-35   | TRANSISTOR UN5113               |         | R502     | 1-220-942-11 | METAL CHIP  | 3.3 1% 1/4      |
| Q701           | 8-729-402-93   | TRANSISTOR UN5214               |         | R551     | 1-216-841-11 | METAL CHIP  | 47K 5% 1/16W    |
| Q702           | 8-729-903-10   | TRANSISTOR FMW1                 |         | R552     | 1-216-841-11 | METAL CHIP  | 47K 5% 1/16W    |
| Q703           | 8-729-402-93   | TRANSISTOR UN5214               |         | R553     | 1-216-841-11 | METAL CHIP  | 47K 5% 1/16W    |
| Q704           | 8-729-026-53   | TRANSISTOR 2SA1576A-T106-QR     |         | R701     | 1-216-821-11 | METAL CHIP  | 1K 5% 1/16W     |
| < RESISTOR >   |                |                                 |         | R702     | 1-216-821-11 | METAL CHIP  | 1K 5% 1/16W     |
| R101           | 1-216-298-00   | METAL CHIP 2.2 5% 1/10W         |         | R703     | 1-216-821-11 | METAL CHIP  | 1K 5% 1/16W     |
| R102           | 1-219-724-11   | METAL CHIP 1 1% 1/4W            |         | R704     | 1-216-841-11 | METAL CHIP  | 47K 5% 1/16W    |
| R103           | 1-216-829-11   | METAL CHIP 4.7K 5% 1/16W        |         | R705     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
| R104           | 1-216-853-11   | METAL CHIP 470K 5% 1/16W        |         | R706     | 1-218-855-11 | METAL CHIP  | 2.2K 0.5% 1/10W |
| R105           | 1-216-863-11   | RES-CHIP 3.3M 5% 1/10W          |         | R707     | 1-218-863-11 | METAL CHIP  | 4.7K 0.5% 1/10W |
| R106           | 1-216-845-11   | METAL CHIP 100K 5% 1/16W        |         | R708     | 1-218-863-11 | METAL CHIP  | 4.7K 0.5% 1/10W |
|                |                |                                 |         | R709     | 1-218-855-11 | METAL CHIP  | 2.2K 0.5% 1/10W |
|                |                |                                 |         | R710     | 1-218-887-11 | METAL CHIP  | 47K 0.5% 1/10W  |
|                |                |                                 |         | R711     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |
|                |                |                                 |         | R712     | 1-216-809-11 | METAL CHIP  | 100 5% 1/16W    |
|                |                |                                 |         | R713     | 1-216-833-11 | METAL CHIP  | 10K 5% 1/16W    |

|    |         |    |    |
|----|---------|----|----|
| BD | DISPLAY | HP | KB |
|----|---------|----|----|

| Ref. No.                       | Part No.     | Description                            |         |     |       | Remarks |
|--------------------------------|--------------|--|---------|-----|-------|---------|
| R802                           | 1-216-864-11 | METAL CHIP                             | 0       | 5%  | 1/16W |         |
| R803                           | 1-216-864-11 | METAL CHIP                             | 0       | 5%  | 1/16W |         |
| R805                           | 1-216-809-11 | METAL CHIP                             | 100     | 5%  | 1/16W |         |
|                                |              |  |         |     |       |         |
| R814                           | 1-216-864-11 | METAL CHIP                             | 0       | 5%  | 1/16W |         |
| R815                           | 1-216-864-11 | METAL CHIP                             | 0       | 5%  | 1/16W |         |
| < SWITCH >                     |              |  |         |     |       |         |
| S101                           | 1-762-596-21 | SWITCH, PUSH (1 KEY) (LIMIT IN)        |         |     |       |         |
| S103                           | 1-771-956-21 | SWITCH, PUSH (1 KEY) (OUT)             |         |     |       |         |
| S104                           | 1-771-955-21 | SWITCH, PUSH (1 KEY) (PLAY)            |         |     |       |         |
| S105                           | 1-771-955-21 | SWITCH, PUSH (1 KEY) (REC)             |         |     |       |         |
| *****                          |              |  |         |     |       |         |
| A-4728-564-A                   |              | DISPLAY BOARD, COMPLETE (AEP, UK, RU)  |         |     |       |         |
| A-4728-571-A                   |              | DISPLAY BOARD, COMPLETE (SP)           |         |     |       |         |
| *****                          |              |  |         |     |       |         |
| *<br>*                         | 4-955-901-01 | CUSHION (FL)                           |         |     |       |         |
|                                | 4-996-686-03 | HOLDER (FL)                            |         |     |       |         |
| < CAPACITOR >                  |              |  |         |     |       |         |
| C750                           | 1-164-159-11 | CERAMIC                                | 0.1uF   |     | 50V   |         |
| C753                           | 1-124-261-00 | ELECT                                  | 10uF    | 20% | 50V   |         |
| C754                           | 1-124-261-00 | ELECT                                  | 10uF    | 20% | 50V   |         |
| C760                           | 1-126-153-11 | ELECT                                  | 22uF    | 20% | 6.3V  |         |
| C761                           | 1-162-294-31 | CERAMIC                                | 0.001uF | 10% | 50V   |         |
|                                |              |  |         |     |       |         |
| C762                           | 1-162-294-31 | CERAMIC                                | 0.001uF | 10% | 50V   |         |
| C766                           | 1-162-215-31 | CERAMIC                                | 47PF    | 5%  | 50V   |         |
| C767                           | 1-164-159-11 | CERAMIC                                | 0.1uF   |     | 50V   |         |
| C768                           | 1-162-294-31 | CERAMIC                                | 0.001uF | 10% | 50V   |         |
| C769                           | 1-162-294-31 | CERAMIC                                | 0.001uF | 10% | 50V   |         |
|                                |              |  |         |     |       |         |
| C770                           | 1-162-294-31 | CERAMIC                                | 0.001uF | 10% | 50V   |         |
| C771                           | 1-164-159-11 | CERAMIC                                | 0.1uF   |     | 50V   |         |
| C776                           | 1-164-159-11 | CERAMIC                                | 0.1uF   |     | 50V   |         |
| < CONNECTOR >                  |              |  |         |     |       |         |
| CN701                          | 1-779-554-21 | CONNECTOR,FFC(LIF(NON-ZIF))17P         |         |     |       |         |
| CN711                          | 1-568-669-11 | CONNECTOR, BOARD TO BOARD 8P           |         |     |       |         |
| < DIODE >                      |              |  |         |     |       |         |
| D772                           | 8-719-075-60 | DIODE SELS5823C-TP15 (MD LP)           |         |     |       |         |
| < FLUORESCENT INDICATOR TUBE > |              |  |         |     |       |         |
| FL750                          | 1-517-987-11 | INDICATOR TUBE, FLUORESCENT            |         |     |       |         |
| < IC >                         |              |  |         |     |       |         |
| IC760                          | 8-759-680-17 | IC MSM9201-04GS-K                      |         |     |       |         |
| < LEAD PIN >                   |              |  |         |     |       |         |
| * LP750                        | 1-690-880-81 | LEAD (WITH CONNECTOR)                  |         |     |       |         |
| < TRANSISTOR >                 |              |  |         |     |       |         |
| Q761                           | 8-729-620-05 | TRANSISTOR 2SC2603-EF                  |         |     |       |         |
| Q762                           | 8-729-620-05 | TRANSISTOR 2SC2603-EF                  |         |     |       |         |
| Q772                           | 8-729-900-80 | TRANSISTOR DTC114ES                    |         |     |       |         |
| < RESISTOR >                   |              |  |         |     |       |         |
| R702                           | 1-249-417-11 | CARBON                                 | 1K      | 5%  | 1/4W  | F       |
| R703                           | 1-249-421-11 | CARBON                                 | 2.2K    | 5%  | 1/4W  | F       |
| R704                           | 1-249-421-11 | CARBON                                 | 2.2K    | 5%  | 1/4W  | F       |
| R705                           | 1-249-425-11 | CARBON                                 | 4.7K    | 5%  | 1/4W  | F       |
| R706                           | 1-249-429-11 | CARBON                                 | 10K     | 5%  | 1/4W  |         |
|                                |              |  |         |     |       |         |
| R712                           | 1-249-417-11 | CARBON                                 | 1K      | 5%  | 1/4W  | F       |
| R713                           | 1-249-421-11 | CARBON                                 | 2.2K    | 5%  | 1/4W  | F       |
| R714                           | 1-249-421-11 | CARBON                                 | 2.2K    | 5%  | 1/4W  | F       |
| R715                           | 1-249-425-11 | CARBON                                 | 4.7K    | 5%  | 1/4W  | F       |
| R716                           | 1-249-429-11 | CARBON                                 | 10K     | 5%  | 1/4W  |         |
|                                |              |  |         |     |       |         |
| R761                           | 1-247-807-31 | CARBON                                 | 100     | 5%  | 1/4W  |         |
| R762                           | 1-247-807-31 | CARBON                                 | 100     | 5%  | 1/4W  |         |
| R763                           | 1-249-441-11 | CARBON                                 | 100K    | 5%  | 1/4W  |         |
| R764                           | 1-249-441-11 | CARBON                                 | 100K    | 5%  | 1/4W  |         |
| R766                           | 1-247-843-11 | CARBON                                 | 3.3K    | 5%  | 1/4W  |         |
|                                |              |  |         |     |       |         |
| R767                           | 1-247-807-31 | CARBON                                 | 100     | 5%  | 1/4W  |         |
| R768                           | 1-247-807-31 | CARBON                                 | 100     | 5%  | 1/4W  |         |
| R769                           | 1-247-807-31 | CARBON                                 | 100     | 5%  | 1/4W  |         |
| R770                           | 1-247-807-31 | CARBON                                 | 100     | 5%  | 1/4W  |         |
| R772                           | 1-249-417-11 | CARBON                                 | 1K      | 5%  | 1/4W  | F       |
| < SWITCH >                     |              |  |         |     |       |         |
| S701                           | 1-762-875-21 | SWITCH, KEYBOARD (REC ●)               |         |     |       |         |
| S702                           | 1-762-875-21 | SWITCH, KEYBOARD (■)                   |         |     |       |         |
| S703                           | 1-762-875-21 | SWITCH, KEYBOARD (▶▶)                  |         |     |       |         |
| S704                           | 1-762-875-21 | SWITCH, KEYBOARD (◀◀)                  |         |     |       |         |
| S705                           | 1-762-875-21 | SWITCH, KEYBOARD (■)                   |         |     |       |         |
|                                |              |  |         |     |       |         |
| S706                           | 1-762-875-21 | SWITCH, KEYBOARD (▷)                   |         |     |       |         |
| S711                           | 1-762-875-21 | SWITCH, KEYBOARD (MENU/NO)             |         |     |       |         |
| S712                           | 1-762-875-21 | SWITCH, KEYBOARD (YES)                 |         |     |       |         |
| S713                           | 1-475-235-21 | ENCODER, ROTARY                        |         |     |       |         |
| (◀◀◀AMS▶▶▶) / PUSH ENTER)      |              |  |         |     |       |         |
| S714                           | 1-762-875-21 | SWITCH, KEYBOARD (CLEAR)               |         |     |       |         |
|                                |              |  |         |     |       |         |
| S715                           | 1-762-875-21 | SWITCH, KEYBOARD (INPUT)               |         |     |       |         |
| S716                           | 1-762-875-21 | SWITCH, KEYBOARD (REC MODE)            |         |     |       |         |
| S721                           | 1-762-875-21 | SWITCH, KEYBOARD (EJECT△)              |         |     |       |         |
| *****                          |              |  |         |     |       |         |
| A-4728-566-A                   |              | HP BOARD, COMPLETE (AEP, UK, RU)       |         |     |       |         |
| 1-684-127-12                   |              | HP BOARD (SP)                          |         |     |       |         |
| *****                          |              |  |         |     |       |         |
| < CAPACITOR >                  |              |  |         |     |       |         |
| C790                           | 1-164-159-11 | CERAMIC                                | 0.1uF   |     | 50V   |         |
| C791                           | 1-162-290-31 | CERAMIC                                | 470PF   | 10% | 50V   |         |
| C792                           | 1-162-290-31 | CERAMIC                                | 470PF   | 10% | 50V   |         |
| C793                           | 1-164-159-11 | CERAMIC                                | 0.1uF   |     | 50V   |         |
| < JACK >                       |              |  |         |     |       |         |
| J791                           | 1-770-307-11 | JACK (LARGE TYPE) (PHONES)             |         |     |       |         |
| < RESISTOR >                   |              |  |         |     |       |         |
| R791                           | 1-249-393-11 | CARBON                                 | 10      | 5%  | 1/4W  | F       |
| R792                           | 1-249-393-11 | CARBON                                 | 10      | 5%  | 1/4W  | F       |
| < VARIABLE RESISTOR >          |              |  |         |     |       |         |
| RV791                          | 1-225-590-11 | RES, VAR, CARBON 20K/20K (PHONE LEVEL) |         |     |       |         |
| *****                          |              |  |         |     |       |         |
| 1-684-128-12                   |              | KB BOARD                               |         |     |       |         |
| *****                          |              |  |         |     |       |         |
| < JACK >                       |              |  |         |     |       |         |
| J780                           | 1-785-945-21 | CONNECTOR, DIN (KEY BOARD)             |         |     |       |         |
| < RESISTOR >                   |              |  |         |     |       |         |
| R1781                          | 1-249-409-11 | CARBON                                 | 220     | 5%  | 1/4W  | F       |
| R1785                          | 1-249-409-11 | CARBON                                 | 220     | 5%  | 1/4W  | F       |
| *****                          |              |  |         |     |       |         |



KEY SW

MAIN

| Ref. No.     | Part No.                           | Description                           | Remarks |
|--------------|------------------------------------|---------------------------------------|---------|
|              | 1-684-126-12                       | KEY SW BOARD<br>*****                 |         |
|              |                                    | < CAPACITOR >                         |         |
| C730         | 1-164-159-11                       | CERAMIC 0.1uF                         | 50V     |
| C740         | 1-164-159-11                       | CERAMIC 0.1uF                         | 50V     |
| C741         | 1-124-584-00                       | ELECT 100uF                           | 20% 10V |
| C742         | 1-162-306-11                       | CERAMIC 0.01uF                        | 20% 16V |
| C747         | 1-164-159-11                       | CERAMIC 0.1uF                         | 50V     |
|              |                                    | < CONNECTOR >                         |         |
| CN721        | 1-766-739-11                       | CONNECTOR, BOARD TO BOARD 8P          |         |
|              |                                    | < DIODE >                             |         |
| D726         | 8-719-071-44                       | DIODE SELS5223C-TP15                  |         |
| D733         | 8-719-075-60                       | DIODE SELS5823C-TP15                  |         |
|              |                                    | < IC >                                |         |
| IC741        | 8-759-826-34                       | IC NJL74H400A                         |         |
|              |                                    | < TRANSISTOR >                        |         |
| Q726         | 8-729-900-80                       | TRANSISTOR DTC114ES                   |         |
| Q733         | 8-729-900-80                       | TRANSISTOR DTC114ES                   |         |
|              |                                    | < RESISTOR >                          |         |
| R722         | 1-249-417-11                       | CARBON 1K 5%                          | 1/4W F  |
| R723         | 1-249-421-11                       | CARBON 2.2K 5%                        | 1/4W F  |
| R724         | 1-249-421-11                       | CARBON 2.2K 5%                        | 1/4W F  |
| R725         | 1-249-425-11                       | CARBON 4.7K 5%                        | 1/4W F  |
| R732         | 1-249-417-11                       | CARBON 1K 5%                          | 1/4W F  |
| R733         | 1-249-421-11                       | CARBON 2.2K 5%                        | 1/4W F  |
| R741         | 1-249-401-11                       | CARBON 47 5%                          | 1/4W F  |
| R742         | 1-247-807-31                       | CARBON 100 5%                         | 1/4W    |
| R747         | 1-249-429-11                       | CARBON 10K 5%                         | 1/4W    |
| R1726        | 1-249-417-11                       | CARBON 1K 5%                          | 1/4W F  |
| R1733        | 1-249-417-11                       | CARBON 1K 5%                          | 1/4W F  |
|              |                                    | < SWITCH >                            |         |
| S722         | 1-762-875-21                       | SWITCH, KEYBOARD (PLAY MODE)          |         |
| S723         | 1-762-875-21                       | SWITCH, KEYBOARD (REPEAT)             |         |
| S724         | 1-762-875-21                       | SWITCH, KEYBOARD (LEVEL/DISPLAY/CHAR) |         |
| S726         | 1-762-875-21                       | SWITCH, KEYBOARD ( I/⌂ )              |         |
| S732         | 1-762-875-21                       | SWITCH, KEYBOARD (SKIP)               |         |
| S733         | 1-762-875-21                       | SWITCH, KEYBOARD (GROUP ON/OFF)       |         |
| S734         | 1-762-875-21                       | SWITCH, KEYBOARD (NET MD)             |         |
| S746         | 1-786-174-11                       | SWITCH, SLIDE (TIMER)                 |         |
| *****        |                                    |                                       |         |
| A-4728-563-A | MAIN BOARD, COMPLETE (AEP, UK, RU) |                                       |         |
| A-4728-570-A | MAIN BOARD, COMPLETE (SP)<br>***** |                                       |         |
|              | 7-685-646-79                       | SCREW +BVTP 3X8 TYPE2 TT(B)           |         |
|              |                                    | < LITHIUM BATTERY >                   |         |
| BT404        | 1-756-121-11                       | BATTERY, LITHIUM SECONDARY            |         |
|              |                                    | < CAPACITOR >                         |         |
| C12          | 1-162-294-31                       | CERAMIC 0.001uF                       | 10% 50V |
| C16          | 1-164-159-11                       | CERAMIC 0.1uF                         | 50V     |
| C19          | 1-162-294-31                       | CERAMIC 0.001uF                       | 10% 50V |
| C58          | 1-162-282-31                       | CERAMIC 100PF                         | 10% 50V |

| Ref. No. | Part No.     | Description     | Remarks  |
|----------|--------------|-----------------|----------|
| C62      | 1-164-159-11 | CERAMIC 0.1uF   | 50V      |
| C85      | 1-162-294-31 | CERAMIC 0.001uF | 10% 50V  |
| C86      | 1-162-294-31 | CERAMIC 0.001uF | 10% 50V  |
| C87      | 1-162-306-11 | CERAMIC 0.01uF  | 30% 16V  |
| C88      | 1-162-306-11 | CERAMIC 0.01uF  | 30% 16V  |
| C89      | 1-162-294-31 | CERAMIC 0.001uF | 10% 50V  |
| C93      | 1-164-159-11 | CERAMIC 0.1uF   | 50V      |
| C100     | 1-126-964-11 | ELECT 10uF      | 20% 50V  |
| C101     | 1-136-356-11 | MYLAR 470PF     | 5% 50V   |
| C102     | 1-128-551-11 | ELECT 22uF      | 20% 25V  |
| C103     | 1-126-933-11 | ELECT 100uF     | 20% 16V  |
| C104     | 1-128-551-11 | ELECT 22uF      | 20% 25V  |
| C111     | 1-137-505-11 | MYLAR 220PF     | 5% 50V   |
| C115     | 1-137-503-11 | MYLAR 0.0001uF  | 5% 50V   |
| C116     | 1-137-503-11 | MYLAR 0.0001uF  | 5% 50V   |
| C117     | 1-136-287-11 | MYLAR 0.0047uF  | 5% 50V   |
| C118     | 1-130-471-00 | MYLAR 0.001uF   | 5% 50V   |
| C119     | 1-128-551-11 | ELECT 22uF      | 20% 25V  |
| C120     | 1-136-356-11 | MYLAR 470PF     | 5% 50V   |
| C126     | 1-126-933-11 | ELECT 100uF     | 20% 16V  |
| C131     | 1-126-933-11 | ELECT 100uF     | 20% 16V  |
| C201     | 1-136-356-11 | MYLAR 470PF     | 5% 50V   |
| C202     | 1-128-551-11 | ELECT 22uF      | 20% 25V  |
| C203     | 1-126-933-11 | ELECT 100uF     | 20% 16V  |
| C204     | 1-128-551-11 | ELECT 22uF      | 20% 25V  |
| C211     | 1-137-505-11 | MYLAR 220PF     | 5% 50V   |
| C215     | 1-137-503-11 | MYLAR 0.0001uF  | 5% 50V   |
| C216     | 1-137-503-11 | MYLAR 0.0001uF  | 5% 50V   |
| C217     | 1-136-287-11 | MYLAR 0.0047uF  | 5% 50V   |
| C218     | 1-130-471-00 | MYLAR 0.001uF   | 5% 50V   |
| C219     | 1-128-551-11 | ELECT 22uF      | 20% 25V  |
| C220     | 1-136-356-11 | MYLAR 470PF     | 5% 50V   |
| C226     | 1-126-933-11 | ELECT 100uF     | 20% 16V  |
| C231     | 1-126-933-11 | ELECT 100uF     | 20% 16V  |
| C401     | 1-126-939-11 | ELECT 10000uF   | 20% 16V  |
| C402     | 1-164-159-11 | CERAMIC 0.1uF   | 50V      |
| C403     | 1-126-933-11 | ELECT 100uF     | 20% 16V  |
| C406     | 1-162-306-11 | CERAMIC 0.01uF  | 30% 16V  |
| C407     | 1-124-252-00 | ELECT 0.33uF    | 20% 50V  |
| C411     | 1-126-768-11 | ELECT 2200uF    | 20% 16V  |
| C421     | 1-126-939-11 | ELECT 10000uF   | 20% 16V  |
| C422     | 1-164-159-11 | CERAMIC 0.1uF   | 50V      |
| C424     | 1-126-916-11 | ELECT 1000uF    | 20% 6.3V |
| C431     | 1-126-963-11 | ELECT 4.7uF     | 20% 50V  |
| C432     | 1-126-963-11 | ELECT 4.7uF     | 20% 50V  |
| C440     | 1-164-159-11 | CERAMIC 0.1uF   | 50V      |
| C441     | 1-126-935-11 | ELECT 470uF     | 20% 16V  |
| C443     | 1-126-935-11 | ELECT 470uF     | 20% 16V  |
| C451     | 1-128-576-11 | ELECT 100uF     | 20% 63V  |
| C452     | 1-164-159-11 | CERAMIC 0.1uF   | 50V      |
| C453     | 1-126-967-11 | ELECT 47uF      | 20% 50V  |
| C461     | 1-126-933-11 | ELECT 100uF     | 20% 16V  |
| C462     | 1-162-306-11 | CERAMIC 0.01uF  | 30% 16V  |
| C471     | 1-126-916-11 | ELECT 1000uF    | 20% 6.3V |
| C472     | 1-164-159-11 | CERAMIC 0.1uF   | 50V      |
| C473     | 1-164-159-11 | CERAMIC 0.1uF   | 50V      |
| C481     | 1-126-965-91 | ELECT 22uF      | 20% 50V  |
| C500     | 1-126-934-11 | ELECT 220uF     | 20% 10V  |
| C501     | 1-164-159-11 | CERAMIC 0.1uF   | 50V      |
| C502     | 1-130-475-00 | MYLAR 0.0022uF  | 5% 50V   |
| C503     | 1-130-475-00 | MYLAR 0.0022uF  | 5% 50V   |

| Ref. No.      | Part No.     | Description                     | Remarks            | Ref. No.            | Part No.     | Description                             | Remarks |
|---------------|--------------|---------------------------------|--------------------|---------------------|--------------|---|---------|
| C504          | 1-126-933-11 | ELECT                           | 100uF 20% 16V      | D444                | 8-719-024-99 | DIODE 11ES2-NTA2B                       |         |
| C505          | 1-164-159-11 | CERAMIC                         | 0.1uF 50V          | D451                | 8-719-024-99 | DIODE 11ES2-NTA2B                       |         |
| C508          | 1-128-801-11 | CERAMIC                         | 22PF 5% 50V        | D452                | 8-719-109-81 | DIODE RD4.7ESB2                         |         |
| C509          | 1-128-801-11 | CERAMIC                         | 22PF 5% 50V        | < GROUND TERMINAL > |              |   |         |
| C515          | 1-162-282-31 | CERAMIC                         | 100PF 10% 50V      | EP440               | 1-537-771-21 | TERMINAL BOARD, GROUND                  |         |
| C516          | 1-162-282-31 | CERAMIC                         | 100PF 10% 50V      | < IC >              |              |   |         |
| C517          | 1-162-282-31 | CERAMIC                         | 100PF 10% 50V      | IC1                 | 6-801-395-01 | IC M30833FJFP-JE7-1                     |         |
| C519          | 1-162-294-31 | CERAMIC                         | 0.001uF 10% 50V    | IC101               | 8-759-634-51 | IC NJM4558D                             |         |
| C520          | 1-126-933-11 | ELECT                           | 100uF 20% 16V      | IC111               | 8-759-634-51 | IC NJM4558D                             |         |
| C522          | 1-164-159-11 | CERAMIC                         | 0.1uF 50V          | IC112               | 8-759-634-51 | IC NJM4558D                             |         |
| C523          | 1-126-933-11 | ELECT                           | 100uF 20% 16V      | IC131               | 8-759-167-88 | IC NJM4565D                             |         |
| C524          | 1-164-159-11 | CERAMIC                         | 0.1uF 50V          | IC401               | 8-759-445-59 | IC BA033T                               |         |
| C541          | 1-164-159-11 | CERAMIC                         | 0.1uF 50V          | IC406               | 8-759-481-02 | IC M62016L                              |         |
| C601          | 1-164-159-11 | CERAMIC                         | 0.1uF 50V          | IC421               | 8-759-231-53 | IC M5F7805L                             |         |
|               |              |                                 | (AEP, UK, RU)      | IC451               | 8-759-633-42 | IC M5293L                               |         |
| C611          | 1-164-159-11 | CERAMIC                         | 0.1uF 50V          | IC461               | 8-759-822-09 | IC LB1641                               |         |
| C612          | 1-126-963-11 | ELECT                           | 4.7uF 20% 50V      | IC500               | 8-759-579-68 | IC AK4524                               |         |
| C613          | 1-162-306-11 | CERAMIC                         | 0.01uF 30% 16V     | IC611               | 6-600-014-01 | IC TORX141L (OPTICAL IN1)               |         |
| C621          | 1-164-159-11 | CERAMIC                         | 0.1uF 50V(SP)      | IC621               | 6-600-014-01 | IC TORX141L (OPTICAL IN2)(SP)           |         |
| C622          | 1-162-306-11 | CERAMIC                         | 0.01uF 30% 16V(SP) | IC631               | 6-600-012-01 | IC TOTX141L (OPTICAL OUT)               |         |
| C631          | 1-164-159-11 | CERAMIC                         | 0.1uF 50V          | IC641               | 8-759-917-18 | IC SN74HCU04AN                          |         |
| C632          | 1-126-963-11 | ELECT                           | 4.7uF 20% 50V      | IC651               | 8-759-916-12 | IC SN74HC00AN                           |         |
| C641          | 1-164-159-11 | CERAMIC                         | 0.1uF 50V          | IC681               | 8-759-917-18 | IC SN74HCU04AN                          |         |
| C651          | 1-164-159-11 | CERAMIC                         | 0.1uF 50V          | < JACK >            |              |   |         |
| C652          | 1-162-306-11 | CERAMIC                         | 0.01uF 30% 16V     | J101                | 1-784-430-11 | JACK, PIN 4P (ANALOG IN/OUT)            |         |
| C681          | 1-164-159-11 | CERAMIC                         | 0.1uF 50V          | J601                | 1-784-432-11 | JACK, PIN 1P (COAXIAL IN) (AEP, UK, RU) |         |
| < CONNECTOR > |              |                                 |                    | < COIL >            |              |   |         |
| CN1           | 1-784-417-11 | CONNECTOR, FFC(LIF(NON-ZIF))23P |                    | L611                | 1-410-509-11 | INDUCTOR 10uH                           |         |
| CN2           | 1-779-295-11 | CONNECTOR, FFC(LIF(NON-ZIF))27P |                    | L631                | 1-410-509-11 | INDUCTOR 10uH                           |         |
| CN3           | 1-815-620-11 | CONNECTOR, FFC(LIF(NON-ZIF))17P |                    | < TRANSISTOR >      |              |   |         |
| CN4           | 1-794-483-11 | CONNECTOR, FFC(LIF(NON-ZIF))19P |                    | Q121                | 8-729-029-94 | TRANSISTOR DTC143TSA                    |         |
| * CN101       | 1-564-705-11 | PIN, CONNECTOR (SMALL TYPE) 3P  |                    | Q151                | 8-729-422-57 | TRANSISTOR UN4111                       |         |
| CN401         | 1-784-928-11 | PIN, CONNECTOR 13P              |                    | Q221                | 8-729-029-94 | TRANSISTOR DTC143TSA                    |         |
| CN404         | 1-568-683-11 | PIN, CONNECTOR (PC BAORD) 2P    |                    | Q411                | 8-729-142-46 | TRANSISTOR 2SC2001-LK                   |         |
| * CN801       | 1-564-706-11 | PIN, CONNECTOR (SMALL TYPE) 4P  |                    | Q461                | 8-729-119-76 | TRANSISTOR 2SA1175-HFE                  |         |
| < DIODE >     |              |                                 |                    | Q462                | 8-729-900-80 | TRANSISTOR DTC114ES                     |         |
| D101          | 8-719-911-19 | DIODE 1SS119-25                 |                    | Q471                | 8-729-194-57 | TRANSISTOR 2SC945-P                     |         |
| D102          | 8-719-911-19 | DIODE 1SS119-25                 |                    | Q801                | 8-729-900-80 | TRANSISTOR DTC114ES                     |         |
| D151          | 8-719-911-19 | DIODE 1SS119-25                 |                    | Q802                | 8-729-620-05 | TRANSISTOR 2SC2603-EF                   |         |
| D152          | 8-719-911-19 | DIODE 1SS119-25                 |                    | Q803                | 8-729-900-80 | TRANSISTOR DTC114ES                     |         |
| D201          | 8-719-911-19 | DIODE 1SS119-25                 |                    | Q804                | 8-729-620-05 | TRANSISTOR 2SC2603-EF                   |         |
| D202          | 8-719-911-19 | DIODE 1SS119-25                 |                    | Q805                | 8-729-900-80 | TRANSISTOR DTC114ES                     |         |
| D401          | 8-719-210-21 | DIODE 11EQS04                   |                    | Q911                | 8-729-922-37 | TRANSISTOR 2SD2144S-UVW                 |         |
| D402          | 8-719-210-21 | DIODE 11EQS04                   |                    | < RESISTOR >        |              |   |         |
| D404          | 8-719-911-19 | DIODE 1SS119-25                 |                    | R10                 | 1-249-441-11 | CARBON 100K 5% 1/4W                     |         |
| D405          | 8-719-210-21 | DIODE 11EQS04                   |                    | R29                 | 1-249-441-11 | CARBON 100K 5% 1/4W                     |         |
| D406          | 8-719-210-21 | DIODE 11EQS04                   |                    | R30                 | 1-249-441-11 | CARBON 100K 5% 1/4W                     |         |
| D411          | 8-719-024-99 | DIODE 11ES2-NTA2B               |                    | R41                 | 1-249-441-11 | CARBON 100K 5% 1/4W                     |         |
| D412          | 8-719-024-99 | DIODE 11ES2-NTA2B               |                    | R44                 | 1-249-429-11 | CARBON 10K 5% 1/4W                      |         |
| D413          | 8-719-024-99 | DIODE 11ES2-NTA2B               |                    | R46                 | 1-249-429-11 | CARBON 10K 5% 1/4W                      |         |
| D414          | 8-719-024-99 | DIODE 11ES2-NTA2B               |                    | R49                 | 1-249-429-11 | CARBON 10K 5% 1/4W                      |         |
| D415          | 8-719-933-36 | DIODE HZS6B1L                   |                    | R51                 | 1-249-429-11 | CARBON 10K 5% 1/4W                      |         |
| D421          | 8-719-024-99 | DIODE 11ES2-NTA2B               |                    | R53                 | 1-249-429-11 | CARBON 10K 5% 1/4W                      |         |
| D422          | 8-719-024-99 | DIODE 11ES2-NTA2B               |                    | R55                 | 1-249-429-11 | CARBON 10K 5% 1/4W                      |         |
| D431          | 8-719-911-19 | DIODE 1SS119-25                 |                    |                     |              |   |         |
| D432          | 8-719-911-19 | DIODE 1SS119-25                 |                    |                     |              |   |         |
| D433          | 8-719-911-19 | DIODE 1SS119-25                 |                    |                     |              |   |         |
| D441          | 8-719-024-99 | DIODE 11ES2-NTA2B               |                    |                     |              |   |         |
| D442          | 8-719-024-99 | DIODE 11ES2-NTA2B               |                    |                     |              |   |         |
| D443          | 8-719-024-99 | DIODE 11ES2-NTA2B               |                    |                     |              |   |         |

# MDS-JE780

Ver. 1.2

MAIN PT

| Ref. No. | Part No.     | Description | Remarks                       | Ref. No.      | Part No.     | Description                    | Remarks                       |
|----------|--------------|-------------|-------------------------------|---------------|--------------|--------------------------------|-------------------------------|
| R61      | 1-249-429-11 | CARBON      | 10K 5% 1/4W                   | R471          | 1-249-411-11 | CARBON                         | 330 5% 1/4W                   |
| R85      | 1-249-429-11 | CARBON      | 10K 5% 1/4W                   | R472          | 1-249-418-11 | CARBON                         | 1.2K 5% 1/4W F                |
| R86      | 1-249-429-11 | CARBON      | 10K 5% 1/4W                   | R511          | 1-247-807-31 | CARBON                         | 100 5% 1/4W                   |
| R87      | 1-249-429-11 | CARBON      | 10K 5% 1/4W                   | R512          | 1-247-807-31 | CARBON                         | 100 5% 1/4W                   |
| R88      | 1-249-429-11 | CARBON      | 10K 5% 1/4W                   | R513          | 1-247-807-31 | CARBON                         | 100 5% 1/4W                   |
| R90      | 1-249-441-11 | CARBON      | 100K 5% 1/4W<br>(AEP, UK, RU) | R514          | 1-247-807-31 | CARBON                         | 100 5% 1/4W                   |
| R92      | 1-249-429-11 | CARBON      | 10K 5% 1/4W                   | R601          | 1-247-804-11 | CARBON                         | 75 5% 1/4W<br>(AEP, UK, RU)   |
| R93      | 1-249-429-11 | CARBON      | 10K 5% 1/4W                   | R602          | 1-249-417-11 | CARBON                         | 1K 5% 1/4W F<br>(AEP, UK, RU) |
| R94      | 1-249-429-11 | CARBON      | 10K 5% 1/4W                   | R612          | 1-249-437-11 | CARBON                         | 47K 5% 1/4W                   |
| R95      | 1-249-429-11 | CARBON      | 10K 5% 1/4W                   | R614          | 1-247-807-31 | CARBON                         | 100 5% 1/4W                   |
| R97      | 1-249-429-11 | CARBON      | 10K 5% 1/4W                   | R622          | 1-249-437-11 | CARBON                         | 47K 5% 1/4W                   |
| R100     | 1-249-441-11 | CARBON      | 100K 5% 1/4W                  | R624          | 1-247-807-31 | CARBON                         | 100 5% 1/4W                   |
| R101     | 1-249-437-11 | CARBON      | 47K 5% 1/4W                   | R651          | 1-247-807-31 | CARBON                         | 100 5% 1/4W                   |
| R102     | 1-249-433-11 | CARBON      | 22K 5% 1/4W                   | R681          | 1-249-439-11 | CARBON                         | 68K 5% 1/4W                   |
| R103     | 1-247-887-00 | CARBON      | 220K 5% 1/4W                  | R682          | 1-249-417-11 | CARBON                         | 1K 5% 1/4W F                  |
| R105     | 1-249-401-11 | CARBON      | 47 5% 1/4W F                  | R683          | 1-247-895-00 | CARBON                         | 470K 5% 1/4W                  |
| R111     | 1-215-445-00 | METAL       | 10K 1% 1/4W                   | R801          | 1-249-429-11 | CARBON                         | 10K 5% 1/4W                   |
| R112     | 1-215-445-00 | METAL       | 10K 1% 1/4W                   | R802          | 1-249-429-11 | CARBON                         | 10K 5% 1/4W                   |
| R113     | 1-215-445-00 | METAL       | 10K 1% 1/4W                   | R803          | 1-249-429-11 | CARBON                         | 10K 5% 1/4W                   |
| R114     | 1-215-445-00 | METAL       | 10K 1% 1/4W                   | R804          | 1-249-429-11 | CARBON                         | 10K 5% 1/4W                   |
| R115     | 1-215-453-00 | METAL       | 22K 1% 1/4W                   | R805          | 1-249-425-11 | CARBON                         | 4.7K 5% 1/4W F                |
| R116     | 1-215-453-00 | METAL       | 22K 1% 1/4W                   | R806          | 1-249-425-11 | CARBON                         | 4.7K 5% 1/4W F                |
| R117     | 1-215-425-00 | METAL       | 1.5K 1% 1/4W                  | R807          | 1-249-429-11 | CARBON                         | 10K 5% 1/4W                   |
| R118     | 1-215-425-00 | METAL       | 1.5K 1% 1/4W                  | R808          | 1-249-429-11 | CARBON                         | 10K 5% 1/4W                   |
| R119     | 1-249-413-11 | CARBON      | 470 5% 1/4W F                 | R809          | 1-249-429-11 | CARBON                         | 10K 5% 1/4W                   |
| R120     | 1-249-413-11 | CARBON      | 470 5% 1/4W F                 | R810          | 1-249-429-11 | CARBON                         | 10K 5% 1/4W                   |
| R122     | 1-249-441-11 | CARBON      | 100K 5% 1/4W                  | R911          | 1-249-421-11 | CARBON                         | 2.2K 5% 1/4W F                |
| R131     | 1-249-397-11 | CARBON      | 22 5% 1/4W F                  | R912          | 1-249-437-11 | CARBON                         | 47K 5% 1/4W                   |
| R151     | 1-249-441-11 | CARBON      | 100K 5% 1/4W                  | R1090         | 1-249-429-11 | CARBON                         | 10K 5% 1/4W<br>(SP)           |
| R152     | 1-247-883-00 | CARBON      | 150K 5% 1/4W                  | R1091         | 1-249-429-11 | CARBON                         | 10K 5% 1/4W                   |
| R201     | 1-249-437-11 | CARBON      | 47K 5% 1/4W                   | < VIBRATOR >  |              |                                |                               |
| R202     | 1-249-433-11 | CARBON      | 22K 5% 1/4W                   | X15           | 1-795-004-21 | VIBRATOR, CERAMIC (10MHz)      |                               |
| R203     | 1-247-887-00 | CARBON      | 220K 5% 1/4W                  | X509          | 1-781-205-21 | VIBRATOR, CRYSTAL (11.2896MHz) |                               |
| R205     | 1-249-401-11 | CARBON      | 47 5% 1/4W F                  | *****         |              |                                |                               |
| R211     | 1-215-445-00 | METAL       | 10K 1% 1/4W                   | 1-684-129-12  | PT BOARD     | *****                          |                               |
| R212     | 1-215-445-00 | METAL       | 10K 1% 1/4W                   | < CAPACITOR > |              |                                |                               |
| R213     | 1-215-445-00 | METAL       | 10K 1% 1/4W                   | △ C911        | 1-113-920-11 | CERAMIC                        | 0.0022uF 20% 250V             |
| R214     | 1-215-445-00 | METAL       | 10K 1% 1/4W                   | C923          | 1-164-159-11 | CERAMIC                        | 0.1uF 50V                     |
| R215     | 1-215-453-00 | METAL       | 22K 1% 1/4W                   | C924          | 1-164-159-11 | CERAMIC                        | 0.1uF 50V                     |
| R216     | 1-215-453-00 | METAL       | 22K 1% 1/4W                   | C952          | 1-164-159-11 | CERAMIC                        | 0.1uF 50V                     |
| R217     | 1-215-425-00 | METAL       | 1.5K 1% 1/4W                  | C953          | 1-164-159-11 | CERAMIC                        | 0.1uF 50V                     |
| R218     | 1-215-425-00 | METAL       | 1.5K 1% 1/4W                  | C954          | 1-164-159-11 | CERAMIC                        | 0.1uF 50V                     |
| R219     | 1-249-413-11 | CARBON      | 470 5% 1/4W F                 | C955          | 1-164-159-11 | CERAMIC                        | 0.1uF 50V                     |
| R220     | 1-249-413-11 | CARBON      | 470 5% 1/4W F                 | < CONNECTOR > |              |                                |                               |
| R222     | 1-249-441-11 | CARBON      | 100K 5% 1/4W                  | * CN901       | 1-580-230-11 | PIN, CONNECTOR (PC BOARD) 2P   |                               |
| R231     | 1-249-397-11 | CARBON      | 22 5% 1/4W F                  | < DIODE >     |              |                                |                               |
| R404     | 1-249-413-11 | CARBON      | 470 5% 1/4W F                 | D911          | 8-719-911-19 | DIODE 1SS119-25                |                               |
| R406     | 1-249-429-11 | CARBON      | 10K 5% 1/4W                   | < FILTER >    |              |                                |                               |
| R411     | 1-249-413-11 | CARBON      | 470 5% 1/4W F                 | △ LF901       | 1-419-625-11 | COIL, LINE FILTER              |                               |
| R431     | 1-247-807-31 | CARBON      | 100 5% 1/4W                   |               |              |                                |                               |
| R432     | 1-249-425-11 | CARBON      | 4.7K 5% 1/4W F                |               |              |                                |                               |
| R433     | 1-247-843-11 | CARBON      | 3.3K 5% 1/4W                  |               |              |                                |                               |
| R434     | 1-249-441-11 | CARBON      | 100K 5% 1/4W                  |               |              |                                |                               |
| R451     | 1-249-433-11 | CARBON      | 22K 5% 1/4W                   |               |              |                                |                               |
| R452     | 1-249-441-11 | CARBON      | 100K 5% 1/4W                  |               |              |                                |                               |
| R453     | 1-249-409-11 | CARBON      | 220 5% 1/4W F                 |               |              |                                |                               |
| R454     | 1-249-409-11 | CARBON      | 220 5% 1/4W F                 |               |              |                                |                               |
| R461     | 1-249-433-11 | CARBON      | 22K 5% 1/4W                   |               |              |                                |                               |
| R462     | 1-249-431-11 | CARBON      | 15K 5% 1/4W                   |               |              |                                |                               |
| R463     | 1-249-433-11 | CARBON      | 22K 5% 1/4W                   |               |              |                                |                               |

The components identified by mark △ or dotted line with mark △ are critical for safety.  
Replace only with part number specified.



|                     |              |                                  |         |     |       | PT      | USB  | VOL SEL            |  |       |    |       |         |
|---------------------|--------------|----------------------------------|---------|-----|-------|---------|--|--------------------|--|-------|----|-------|---------|
| Ref. No.            | Part No.     | Description                      |         |     |       | Remarks | Ref. No.   | Part No.           | Description                            |       |    |       | Remarks |
| < RELAY >           |              |                                  |         |     |       |         | R207   | 1-216-864-11       | METAL CHIP                             | 0     | 5% | 1/16W |         |
| △ RY911             | 1-755-407-11 | RELAY (AC POWER)                 |         |     |       |         | R209   | 1-216-833-11       | METAL CHIP                             | 10K   | 5% | 1/16W |         |
| < TRANSFORMER >     |              |                                  |         |     |       |         | R210   | 1-216-833-11       | METAL CHIP                             | 10K   | 5% | 1/16W |         |
| △ TR951             | 1-437-693-11 | TRANSFORMER, POWER (SP)          |         |     |       |         | R212   | 1-216-864-11       | METAL CHIP                             | 0     | 5% | 1/16W |         |
| △ TR951             | 1-437-692-11 | TRANSFORMER, POWER (AEP, UK, RU) |         |     |       |         | R213   | 1-216-864-11       | METAL CHIP                             | 0     | 5% | 1/16W |         |
| *****               |              |                                  |         |     |       |         | R214   | 1-216-864-11       | METAL CHIP                             | 0     | 5% | 1/16W |         |
| A-4728-568-A        |              |                                  |         |     |       |         | R216   | 1-216-833-11       | METAL CHIP                             | 10K   | 5% | 1/16W |         |
| USB BOARD, COMPLETE |              |                                  |         |     |       |         | R217   | 1-216-839-11       | METAL CHIP                             | 33K   | 5% | 1/16W |         |
| *****               |              |                                  |         |     |       |         | R218   | 1-216-837-11       | METAL CHIP                             | 22K   | 5% | 1/16W |         |
| < CAPACITOR >       |              |                                  |         |     |       |         | R219   | 1-216-801-11       | METAL CHIP                             | 22    | 5% | 1/16W |         |
| C201                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | R220   | 1-216-801-11       | METAL CHIP                             | 22    | 5% | 1/16W |         |
| C202                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | R221   | 1-216-823-11       | METAL CHIP                             | 1.5K  | 5% | 1/16W |         |
| C206                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | R222   | 1-216-864-11       | METAL CHIP                             | 0     | 5% | 1/16W |         |
| C211                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | R223   | 1-216-864-11       | METAL CHIP                             | 0     | 5% | 1/16W |         |
| C212                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | R224   | 1-216-864-11       | METAL CHIP                             | 0     | 5% | 1/16W |         |
| C215                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | R241   | 1-216-821-11       | METAL CHIP                             | 1K    | 5% | 1/16W |         |
| C216                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | R242   | 1-216-841-11       | METAL CHIP                             | 47K   | 5% | 1/16W |         |
| C217                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | R243   | 1-216-864-11       | METAL CHIP                             | 0     | 5% | 1/16W |         |
| C218                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | < VIBRATOR >   |                    |  |       |    |       |         |
| C219                | 1-162-919-11 | CERAMIC CHIP                     | 22PF    | 5%  | 50V   |         | X201   | 1-567-865-11       | VIBRATOR, CRYSTAL (12MHz)              | ***** |    |       |         |
| C220                | 1-162-919-11 | CERAMIC CHIP                     | 22PF    | 5%  | 50V   |         |  |                    |  |       |    |       |         |
| C221                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | 1-684-130-12   | VOL SEL BOARD (SP) | *****                                  |       |    |       |         |
| C223                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | < CONNECTOR >  |                    |  |       |    |       |         |
| C226                | 1-162-964-11 | CERAMIC CHIP                     | 0.001uF | 10% | 50V   |         | * CN991  | 1-573-565-11       | PIN, CONNECTOR(3.96MM PITCH)5P         | (SP)  |    |       |         |
| C227                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | < SWITCH >   |                    |  |       |    |       |         |
| C228                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | △ S991   | 1-771-474-11       | SWITCH, POWER (VOLTAGE SELECTOR)(SP)   | ***** |    |       |         |
| C230                | 1-216-864-11 | METAL CHIP                       | 0       | 5%  | 1/16W |         | MISCELLANEDUS  |                    |  |       |    |       |         |
| C235                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | *****  |                    |  |       |    |       |         |
| C236                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | △  | 1-569-008-21       | ADAPTOR, CONVERSION (SP)               |       |    |       |         |
| C241                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | △  | 1-770-019-11       | ADAPTOR, CONVERSION PLUG 3P (UK)       |       |    |       |         |
| C242                | 1-164-156-11 | CERAMIC CHIP                     | 0.1uF   |     | 25V   |         | △ 6  | 1-777-071-63       | CORD, POWER                            |       |    |       |         |
| < CONNECTOR >       |              |                                  |         |     |       |         | * 8  | 1-569-972-21       | SOCKET, SHORT 2P                       |       |    |       |         |
| CN201               | 1-778-691-11 | CONNECTOR, FFC/FPC 19P           |         |     |       |         | 12   | 1-824-046-11       | WIRE (FLAT TYPE) (19 CORE)             |       |    |       |         |
| CN203               | 1-815-194-11 | CONNECTOR, USB (B) (USB)         |         |     |       |         | 58   | 1-824-047-11       | WIRE (FLAT TYPE) (23 CORE)             |       |    |       |         |
| < DIODE >           |              |                                  |         |     |       |         | 59   | 1-824-048-11       | WIRE (FLAT TYPE) (27 CORE)             |       |    |       |         |
| D201                | 8-719-988-61 | DIODE 1SS355TE-17                |         |     |       |         | 113  | 1-824-045-11       | WIRE (FLAT TYPE) (17 CORE)             |       |    |       |         |
| < FERRITE BEAD >    |              |                                  |         |     |       |         | 117  | 1-500-082-11       | CLAMP, SLEEVE FERRITE                  |       |    |       |         |
| FB201               | 1-216-864-11 | METAL CHIP                       | 0       | 5%  | 1/16W |         | 357  | 1-678-514-11       | PWB, FLEXIBLE                          |       |    |       |         |
| FB202               | 1-216-864-11 | METAL CHIP                       | 0       | 5%  | 1/16W |         | △ 358  | A-4672-541-A       | OPTICAL PICK-UP KMS-260E               |       |    |       |         |
| FB203               | 1-216-864-11 | METAL CHIP                       | 0       | 5%  | 1/16W |         | HR901  | 1-500-670-22       | HEAD, OVER LIGHT                       |       |    |       |         |
| FB204               | 1-216-864-11 | METAL CHIP                       | 0       | 5%  | 1/16W |         | M101   | A-4735-757-A       | MOTOR ASSY, SPINDLE                    |       |    |       |         |
| < IC >              |              |                                  |         |     |       |         | M102   | A-4735-076-A       | MOTOR ASSY, SLED                       |       |    |       |         |
| IC201               | 8-752-415-60 | IC CXD1873R                      |         |     |       |         | M103   | A-4735-074-A       | MOTOR ASSY, LOADING                    |       |    |       |         |
| IC202               | 8-759-058-57 | IC TC7S04FU-TE85L                |         |     |       |         | S102   | 1-771-957-11       | SWITCH, PUSH (2 KEY) (REFLECT/PROTECT) |       |    |       |         |
| < COIL >            |              |                                  |         |     |       |         | △ TR901  | 1-437-339-11       | TRANSFORMER, POWER (AEP, UK, RU)       |       |    |       |         |
| L202                | 1-216-864-11 | METAL CHIP                       | 0       | 5%  | 1/16W |         | △ TR901  | 1-437-340-11       | TRANSFORMER, POWER (SP)                | ***** |    |       |         |
| L203                | 1-216-864-11 | METAL CHIP                       | 0       | 5%  | 1/16W |         |  |                    |  |       |    |       |         |
| < RESISTOR >        |              |                                  |         |     |       |         |  |                    |  |       |    |       |         |
| R202                | 1-216-833-11 | METAL CHIP                       | 10K     | 5%  | 1/16W |         | The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified. |                    |  |       |    |       |         |
| R204                | 1-216-809-11 | METAL CHIP                       | 100     | 5%  | 1/16W |         |  |                    |  |       |    |       |         |
| R205                | 1-216-864-11 | METAL CHIP                       | 0       | 5%  | 1/16W |         |  |                    |  |       |    |       |         |
| R206                | 1-216-864-11 | METAL CHIP                       | 0       | 5%  | 1/16W |         |  |                    |  |       |    |       |         |

The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

| Ref. No. | Part No.     | Description  | Remarks |
|----------|--------------|--|---------|
|          |              | ACCESSORIES<br>*****                               |         |
|          | 1-476-723-11 | COMMANDER, STANDARD (RM-D10E)                      |         |
|          | 1-574-264-11 | CORD, LIGHT PLUG                                   |         |
|          | 1-823-975-11 | CABLE, CONNECTION (USB)                            |         |
|          | 1-791-732-11 | CORD, CONNECTION (PIN CABLE)                       |         |
|          | 4-237-880-12 | CD-ROM   |         |
|          | 4-237-882-11 | MANUAL, INSTRUCTION (GREEK) (AEP)                  |         |
|          | 4-237-882-21 | MANUAL, INSTRUCTION (CZECH,HUNGARIAN)<br>(AEP)     |         |
|          | 4-237-882-31 | MANUAL, INSTRUCTION (TURKISH) (AEP)                |         |
|          | 4-237-882-41 | MANUAL, INSTRUCTION (SLOVAK) (AEP)                 |         |
|          | 4-239-187-11 | MANUAL, INSTRUCTION (ENGLISH)(EXCEPT RU)           |         |
|          | 4-239-187-21 | MANUAL, INSTRUCTION (FRENCH) (AEP,SP)              |         |
|          | 4-239-187-31 | MANUAL, INSTRUCTION (SPANISH) (AEP,SP)             |         |
|          | 4-239-187-41 | MANUAL, INSTRUCTION<br>(GERMAN,DUTCH,SWEDISH)(AEP) |         |
|          | 4-239-187-51 | MANUAL, INSTRUCTION (ITALIAN)(AEP)                 |         |
|          | 4-239-187-61 | MANUAL, INSTRUCTION<br>(TRADITIONAL CHINESE)(SP)   |         |
|          | 4-239-187-71 | MANUAL, INSTRUCTION (DANISH,FINNISH)<br>(AEP)      |         |
|          | 4-239-187-81 | MANUAL, INSTRUCTION (RUSSIAN) (RU)                 |         |
|          | 4-241-444-11 | MANUAL, INSTRUCTION (GREEK)(AEP)                   |         |
|          | 4-241-444-21 | MANUAL, INSTRUCTION (CZECH,HUNGARIAN)<br>(AEP)     |         |
|          | 4-241-444-31 | MANUAL, INSTRUCTION (TURKISH)(AEP)                 |         |
|          | 4-241-444-41 | MANUAL, INSTRUCTION (SLOVAK)(AEP)                  |         |
|          | 4-981-643-11 | COVER, BATTERY (For RM-D10E)                       |         |

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## REVISION HISTORY

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Also, clicking the version at the upper right on the revised page allows you to jump to the next revised page.

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